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ORIGINAL ARTICLES

SOME BIOLOGIC ASPECTS OF ORTHODONTIA*

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I HAVE been asked to present a short paper upon the biologic aspects of Orthodontia, not because I am an orthodontist, but rather because I am interested in some facts in biology. It is perhaps important at the outset to define and to interpret the term so that the field may be divided into those portions which are of particular interest to us.

The two great divisions of nature are those referring to the living, or animate nature, and the nonliving, or inanimate nature. Although the rocks, the air, and the oceans are in themselves inanimate, yet they constitute the environment for the existence of all living things, both vegetable and animal. But our present state of knowledge provides us with no definite link between the nonliving and the living. We are accustomed to think in terms of atoms, molecules, ions and electrons, with the one classification, and in terms of cells and cell aggregates with the other. The science embracing the study of cells is comparatively new. The old Hippocratic idea of pathology obtained, with certain changes, up to the nineteenth century, for cellular pathology was first enunciated as a theory in 1850. Before that time the humoral concept held sway. There were four fluids or humors of the body responsible for health or disease depending upon whether they were present in the correct proportion. The blood, phlegm, yellow bile, and black bile constituted the four influences which controlled the degree of health of the individual.

In 1802, Treviranus combined the two Greek words "bios" meaning life, and "logos" meaning word, or, more freely, science, into the term biology.

*Read before the Pacific Coast Society of Orthodontists, San Francisco, Calif., May 14 and 15, 1923.

He says, "The subjects of our enquiry will be the various forms and phenomena of life, the conditions and laws under which this life occurs and the causes through which it is brought about. The science that occupies itself with these subjects is designated as biology or the science of life." Other and more modern writers have developed this theme and we have the works of Darwin, Huxley, Spencer, and many others discussing with great clarity and forcibleness some of the problems in this field.

The first publication of the cell theory, in 1838, did not fully recognize the close relationship between the vegetable and the animal kingdoms, but one of the fundamental generalizations which is now accepted is that the *physical* basis of life, the living substance, or protoplasm, possesses certain fundamental characteristics which are essentially the *same* wherever they may be found.

In the first place, the living substance occurs in certain aggregates which are termed organic individuals. One might argue that a crystal, like salt, for example, exists as an aggregate, but if one dissolves the crystal or crushes it, it still remains salt, while a single blow is sufficient to change a living ox into dead beef. What is it then, that constitutes the difference between the two phenomena? Virchow wrote in 1850, that "every animal presents itself as a sum of vital unities, every one of which manifests all the characteristics of life." Such a definition does not apply to the salt crystal. So the answer to our question is to be found in the activity or inactivity of the individual cells composing the animal. These cells are units which in the aggregate may compose a flower, a fish, an ox, or a man. When the cells suffer an alteration in environment, or when an untoward physical change is produced, such an event is manifested in variations of form or function of the cells. When these mutations are *gradual*, the ultimate result may be a *development*, or on the other hand, a *degeneration* of a whole species of animals. When the changes are *abrupt* and severe, it may mean an entire cessation of cell activity, which is commonly denominated as death.

The developmental processes by which animals have been evolved from lower structures, and the environments which have been prejudicial to their propagation, have been also correlated by Darwin, Huxley and Spencer into such works as the "Origin of Species," "Man's Place in Nature," and so forth. In their study of biology they have recognized certain principles among which the laws of heredity play an extensive part. It has been determined that every living thing, either vegetable or animal, develops in accordance with these scientific principles or laws. These laws also form the basis for the study of heredity, natural selection, and natural variation. The individual life, at its inception or conception, is determined in part by those attributes possessed by parents and ancestors. An understanding of some of the underlying principles of heredity is of service to us in interpreting the past, in controlling the present conduct, and perhaps in forecasting the future. These are some of the essential elements in heredity and

they have been exemplified over and over again in many different experiments of biologic research.

In this particular field of orthodontia, it is sometimes noted that the features of parents may be entirely disharmonious whereas the *offspring*, by an apparent happy combination, (in exercising a wise selection of parents), have developed rather pleasing characteristics. On the other hand there are examples of atavism, in which the child presents some peculiarity inherent in a far distant forbear. In the parlance of the biologist, he is perhaps a "throw back" to a former generation.

No two individuals are alike in every minute respect and this dissimilarity, either greater or smaller, is explained by the law of natural variation. These variations are not those which may develop from abnormal or artificial stimuli, nor are they due to the adaptive forces of environment, but they are rather inherent within each individual organism, and result from *intrinsic* factors rather than from extrinsic ones. Bone enlargements, since they arise from abnormal stimuli, are extrinsic manifestations of this condition.

Although variations in individuals occur, their frequency is counteracted to a greater or lesser extent by the more general laws of natural selection. Nature attempts to mould her children so that they will be best prepared to withstand the hardships of existence. The theory of the survival of the fittest is as true today as when first enunciated by Darwin and Huxley, and it is exemplified in as many ways. In this process of natural selection the most important factor probably is environment. That alone may impose extreme conditions of hard living upon the individual or upon the group. We cannot well imagine nor picture the conditions of the life endured by the many King Tuts or their predecessors, but that their mode of life was suited to their happy environment is made evident by an investigation of the localities in which their remains are found. Their salubrious climate led them to the practice of many luxurious habits of living for their degree of civilization.

So today our present environment governs our lives, and our every-day experiences are moulding themselves for the future generations. Perhaps one of the most potent of these experiences is our habit of diet. "Anything to fill the stomach," as the farmer said when he put green goggles on the horse and fed him excelsior. Just as Dobbin was beginning to eat it, he "up and died."

A faulty nutrition of the body affects even more profoundly the nutrition of the individual units of vitality, the cells. In order that these may be replaced by new cells it is necessary that each one carry on five processes, namely, those of assimilation of food, excretion of waste products, growth, repair of injury, and response to stimuli.

Although the structure of the cell aggregates is widely different, the structure of the *individual cells* is similar. Neither have many noteworthy differences in chemical composition been found. The living cell is usually of an alkaline or a neutral reaction, but dead protoplasm is generally acid;

both, however, possess the same chemical elements. Those which occur in greatest proportions are carbon, hydrogen, oxygen and nitrogen. Some of the nitrogenous substances, the proteins, suffer coagulation at the death of the organism. One of the essential characteristics of vital protoplasm is that it is constantly changing by building up some substances and breaking down others. But at death, only degenerative changes occur.

The origin of the first manifestation of life has not been proved. It is here that science and theology cross swords. However, the doctrine of biogenesis propounded by Huxley maintains that lifeless material, the rocks, the air, may only be converted into living substance by a process of assimilation and that this can take place only in the presence of preexisting living substance. The direct connection between the inanimate and the animate worlds is either not known or else is not understood.

The cells, since they are the units of life, have been studied from several general aspects:

1. Their *normal* form and structure, as given in anatomy and histology; their *abnormal* variations, which occur in disease, constitute the study of pathologic anatomy.

2. Their *function*; what do they do, and how do they do it? How do cells perform under normal health conditions and how do those functions change in disease?

3. Their *environment*; where are they found, and what is their chronology or distribution throughout the world? What agencies are favorable and unfavorable to growth?

We are more particularly interested in the last two, namely, function and distribution, than in histologic differences. We wish to determine the agencies at our command which will promote the growth of bone; what methods are favorable or unfavorable for stimulation of cell activity. Up to the present time, the orthodontist has utilized only one of the properties of cells, namely, the response which they make to stimuli. They have produced this response by the placing of orthodontic appliances which in turn affect bone changes on account of mechanical stresses produced. They have sought to induce bone growth merely by utilizing this response of cells to pressure and traction, and have neglected the more important aid, namely, the response of cells to a more favorable environment.

Every living cell must assimilate food and excrete waste products in order to grow and develop. Consider the importance, the prime importance, of this condition. These factors which increase cell activity, from the standpoint of nutrition and excretion, are just as necessary for bone development as those which produce a response to stimuli. How much more rapidly could the work be accomplished if more attention were given to the fundamentals of nutrition. Although the complete etiology of malocclusion is not definitely known, it is possible that much light will be thrown upon this condition when a more thorough study of nutritional problems is made. The scientific world today is greatly interested in the developments in nutrition, not only from the standpoint of vitamins and all of their correlated factors, but also

from the standpoint of mineral metabolism and the interrelation of the ductless glands. Laboratories in this country and abroad are straining every effort to solve the mysteries with which the biologic world is confronted, but with two possible exceptions, the dental aspect is not being considered. Particularly in orthodontia is there a great need for research. The success of treatment, insofar as orthodontic appliances are concerned, is phenomenal—stupendous. How much more would orthodontists be able to do for their patients, if they more fully understood and applied the fundamentals of nutrition. This application would demand very close cooperation with the internist, with the physician and with the dietitian. Such a cooperation is highly desirable and essential. But no matter how great this correlation, the problem resolves itself into certain essentials of nutrition. Now is the time for study. The number of cases of malocclusion are increasing daily and yet practically nothing is being accomplished for the prevention of these conditions. *After* the damage has occurred, the patient consults the specialist. He should consult the specialist *before* the damage is done, and the specialist should have the opportunity of placing at the disposal of his patient every possible means for stimulation of cell growth. This stimulation has resolved itself, up to the present time, merely in the placing of “D” bands, ribbon arches, and other similar appliances. If at the same time you could advise the patient to consult the internist and dietitian for guidance in general building up of the body, you would be favoring the bone cell growth by providing the body with some of those food elements necessary for correct metabolism.

The following instance shows how the diet of puppies has affected the retention of their deciduous teeth. This is part of an experiment performed and conducted by Dr. W. P. Lucas, head of the Department of Pediatrics, University of California, and Dr. M. Jones of the George William Hooper Foundation for Medical Research. The puppies were placed upon a diet normal in every respect, except insofar as the relationship of calcium to phosphorus was concerned. The phosphate ion and the calcium ion were varied in both amount and relationship. Although this particular study was directed toward the etiology of rickets, the dental aspect was very interesting. The puppies, all of the same litter, were fed different diets for varying periods of time, and then sacrificed. Upon examination of the jaws it was found that certain alterations in diet, which I will not detail at this moment, influenced to a very great extent the development of the secondary teeth and the retention of the deciduous teeth. The results are being checked, at the present time, by repeating the experiments so that definite details relative to this phase of the work are withheld until a repetition has been effected. The results are of such a nature, however, as to indicate the important relation of diet to developing teeth, and this is only a single instance of what can be done in research in this field. Experiments of this nature should be duplicated and extended, by developing an organization which will

possess facilities for the prosecution of *studies* of this most interesting and important problem.

It is hoped that the dental profession will realize, even more than it does, the necessity for support of research work, not only for financial, but for intellectual support. Attendance at meetings is merely one of the instances in which intellectual support may be given. It is unfortunate that many of the men find it not worth their while to attend dental meetings, because there is so much material offered which does not interest them and which does not deal with their particular field. However, they cannot improve matters by staying away from meetings. By attendance and by discussions of some of the papers perhaps constructive work would follow. This constructive work must take form in actual participation and support of research problems. We should have, on the Pacific Coast, a research institution similar to that of Rochester or of Boston. It is not that California lacks wealth, it is that California lacks interest. And this lack of interest comes back directly to the dentist. It is my sincere hope that the time may not be far distant when a concerted effort will bring about the establishment of a permanent institution, or of a department such as Rochester, New York, boasts of in the Rochester Dental Infirmary, an institution now an integral part of the University of Rochester.

Of all the specialties in dentistry, this particular one of orthodontia is in a position to profit, more than any other, by supporting the men interested in original investigations, and should be able to see directly the beneficial results accruing from the selection of a correct diet. But no one yet knows exactly what constitutes a correct diet. That we must learn. I should like to continue these studies in bone metabolism, but I have not sufficient funds available for it, and probably will not have until a very large donation is made.

In conclusion then, I have outlined the relationship of one of the many parts of biology to orthodontia. Increase in rate of cell growth is accomplished at present merely by inducing a response to a mechanical stimulus. This procedure, although conducive to remarkable bone growth may be made even more efficient when a more favorable cell environment is effected. Experimental data are presented which illustrate the effects produced by a deficient diet upon the time of eruption and the position of permanent teeth in dogs.

DISCUSSION

Dr. B. Frank Gray.—I am sure the members of this Society are indebted to Dr. Marshall for his splendid paper. I think we all realize that we have confined our work and studies in orthodontia too closely to the mechanical methods of tooth movement. However, this is not strange in view of the fact that under most circumstances we are so dependent upon such means for bringing about our results. But it is a happy thing for our specialty that we are more and more awakening to the value of a proper knowledge and a wider reading of the subjects collateral to orthodontia. Indeed in the case of biology, I suppose we should consider it an absolute essential, preparatory to the prosecution of our work. We have to our credit the fact that we have been listening with interest to the findings in related fields. First our interest was awakened to the importance of rhin-

ology; then the pediatrician, with his broad knowledge of child welfare in general, claimed our respect; certain studies along the line of endocrinology beckoned to us, and they are making us wonder if there may be help in that direction. The importance of nutrition has been emphasized by Dr. Marshall. The work of Doctors McCollom and Howe have been immensely interesting, and we are convinced there is much of practical value to the dentist and orthodontist to be learned in that direction. It has been our good fortune to have both Doctors McCollom and Howe address us here in San Francisco.

It is a commonplace observation among us, I am sure, that in two given cases of malocclusion, resembling each other insofar as such a thing is possible, a prompt correction may be made in one instance, while in the other the response is entirely different—in fact a stubborn resistance may be evident. Here possibly these studies in nutrition, endocrinology, etc., may offer some explanation of our lack of success.

Personally I am grateful to Dr. Marshall for his fine presentation, and I hope it will prove a stimulus to us to avail ourselves more and more of the opportunities to inform ourselves along the lines he has so well outlined.

Dr. James D. McCoy.—I also feel that we have been given a treat in Dr. Marshall's paper. We all realize our deficiencies when it comes to a working knowledge of biology, but I believe we all have a sense of appreciation of what a more complete knowledge of this science would mean to us, and to our work. We have gone almost as far as we can along the lines of mechanics. At least, we have several forms of mechanism which will bring about the changes we desire, and yet in using these various mechanisms our efforts have been largely empiric. Doubtless we will all admit that the next great advancement in our work will have to come from a more complete understanding of its biologic phases.

It seems to me there is no field of study offering a greater fascination than that of biology. It is of interest to us in so many different ways in our work, as amply demonstrated by our essayist. Take the question of heredity which has offered more or less of a controversial aspect in our ranks for many years, which has not brought us anywhere because we did not have a deep enough knowledge of the subject from a biologic standpoint. You all doubtless recall the fact that some of the most important work ever done in the line of heredity was done in 1865 by a Silician monk, named Gregor Mendel, who conducted a series of experiments in the garden of his monastery, using the ordinary garden pea as the source of his experiments. His work attracted but little attention, although it was published in the archives of some scientific society of Vienna, before which he read his paper. Not until many years after he was forgotten was a series of experiments undertaken by a Dutch biologist named DeVries, in which he used the fly, or bee as a means of determining the laws of heredity and of determining to what degree physical characteristics were transmitted from parent to offspring. During his research, he came upon the findings of Gregor Mendel and found his findings identical with those of Mendel. Through these experiments, many of the fundamental questions of heredity have been determined. This is not a new subject, but one unappreciated before our time, just as we have not appreciated its full significance to our work. I believe that such papers as Dr. Marshall's will act as a stimulus to renew our interest in this important subject.

Dr. John E. McCoy.—I appreciated Dr. Marshall's paper greatly. While I hardly feel capable of discussing it, I will say I have for the past few years felt we must co-operate with the other members of the medical profession in straightening out the nutrition of our young patients. I am sure that unless we do this the success of our mechanical treatment will be but temporary.

Dr. A. A. Suggett.—It is interesting to see that perhaps there is an explanation not very far away of some of the things that have been preventing success in certain of our cases. The fact that we have been able to develop the growth of bone by mechanical stimulation has been a leading thought itself, leading the medical profession into an appreciation of our work. I have asked surgeons why that principle has not been used in their work. It is hardly understood by them today that we can, by mechanical stimulation, produce bone growth. If we can solve some of these problems that Dr. Marshall and other

men are studying along research lines there is no question but that we will begin to do real, scientific work, and will be practicing prevention. We have done very little in preventive dentistry, and are just starting with the prophylactic nurse in the cleaning of teeth, etc. The work that Dr. Marshall is doing regarding the ductless glands, and the papers we heard in the Los Angeles meeting last year, show the most wonderful possibilities for the future. This eliminates some of the superstitions that have confronted us. We hardly appreciate how these superstitions have hindered us. Instead of asking what the reason is for some of our difficulties we have had some superstition that there is an evil eye or demon preventing our progress. I think we will get away from these superstitions and see that every effect has an adequate cause, and we must work along these lines.

Dr. T. R. Sweet.—I would like to ask Dr. Marshall a question. It is my belief that certain types of malocclusion are hereditary, and I have often wondered if many of the cases giving trouble in retention are not of the hereditary type. Should we have more trouble in retaining a case of hereditary malocclusion than one caused by mouth breathing? The mouth breathing may have been eliminated and thus but little trouble might be experienced along that line, but where there are hereditary characteristics we cannot very well eliminate those.

Dr. Harvey A. Stryker.—I would like to ask Dr. Marshall to suggest books upon this subject that would be practical for the orthodontist to study.

The doctor brought out three points of importance; one being the fact that we should put as much study on favorable environment as on the question of mechanical appliances; second, that we need a better understanding of nutrition; and third, the opportunity that we have in preventive orthodontia in the matter of referring these children to the pediatrician for needed service, before a very marked malocclusion has developed.

The average physician does not appreciate the relationship between malocclusion and the general bodily disturbances of malnutrition, and because of his lack of understanding of the fundamental principles of orthodontia, it is often very difficult to gain his cooperation. We are grateful to Dr. Marshall for this very excellent paper upon which he has given so much thought and study.

Dr. Taylor.—I think the biologist recognizes it as a fact that we can inherit malocclusion of the teeth.

Dr. John A. Marshall (closing).—I feel highly complimented because of the remarks that have been made. It is quite unusual to get such a response to a paper. You have asked me some questions to which I may have to give you a Yankee answer and ask another. In the order in which they were asked: Dr. Gray spoke of the response to orthodontic treatment varying in different individuals although the conditions being treated and the appliances seemed similar. That was one of the very points I had in mind when I spoke of cell environment—of the relation of the biology of the cell to the child's future.

I do not know really what a correct diet is; nobody knows that. But the following facts are well recognized: first, that we should eat food in which active metabolism is going on, e.g., certified milk, oranges, apples and similar fresh fruits and vegetables; second, that these foods should contain the food accessories which favor calcium metabolism; and third, that the food is properly prepared and not cooked to death. These factors may show some direct correlation, and explain why Johnny Jones responds at once to orthodontic treatment, while Billy Smith, with every advantage in the way of food, does not respond at all. Many of these things are the problems that your internist and dietitian are struggling with today. They are often solved with a change of diet or environment, etc.

The sunlight of outdoors is better than that of indoors. When we go into a solarium, we find a beautiful big room enclosed with glass. While giving the patients the best advantages, it might be pointed out that every window glass contains lead, which acts as a filter, and which filters out and absorbs a portion of the beneficial rays of light.

Regarding heredity, I was interested in what Dr. James McCoy said of the Mendelian theory. Mendel worked with garden peas, taking a tall variety and a short variety, and

crossed them back and forth. The first cross possessed the dominant characteristics, the second cross possessed the recessive characteristics. In one the dominant characteristic was more apparent, and in the other the recessive. The interrelationship of these things is evident, and how can we say that one particular type of malocclusion may or may not be due to heredity and that it will be more difficult to control than another type which is due to some particular habit? We cannot quite account for this fact.

Heredity constitutes a part of biology, but just what particular part does it play in the biologic study of our own restricted sphere? It cannot be said that all our cases of malocclusion are due to heredity, nor that heredity has no influence in the etiology of malocclusion. There must be a relationship, whether great or small, I do not know. The relationship does exist in other biologic sciences, and why not in orthodontia?

Stanford has done one of the biggest things in the last decade in organizing a Department of the Biologic Sciences. I think that will be followed out in many of the other institutions throughout the world. It provides a department where the different divisions of biology can be taught, and perhaps mastered, with a certain degree of success by the student.

Another point, about the value of muscular exercise. This is another way in which bone growth can be stimulated. Why? Because you thus increase the circulation. You bring more food to the part, promoting cell activity, accelerating the removal of the waste products and thus producing an artificial stimulus in which the rate of cell development is increased. You secure a new growth impetus in that particular area, and that is the impetus you want.

One of the important things is to be able to recognize an undernourished child. What are some of the particular symptoms by which we know malnutrition exists in our patients? Underweight, pallor, lassitude, etc.

As to the stimulation of bone growth from the standpoint of the physician, I do not know whether Dr. Suggett had in mind a stimulation of the process of resolution of a callus following a fracture or not. The pediatrician is interested in getting the bone to knit in the shortest possible space of time, and it is difficult to see how prosthetic (orthopedic?) appliances applied to the limb would help the organization of the callus.

Dr. Stryker asked to be referred to some books relating to these subjects. The choice of texts depends upon how carefully you really want to go into biology. Biology is not light reading; it is not like reading a copy of the Saturday Evening Post! It should be taken in small doses and thoroughly "digested," otherwise mental indigestion may follow! I suggest you read five or six pages each day of Darwin's *Origin of Species*, reading but a short time on each occasion. Then put in your own words what you have read and you will get the most out of these five or six pages. For your immediate problems, I suggest two books by McCollom, one intended more for the housewife, in which are given the recipes and dietaries sufficient for a year, I think. That book is *The American Home Diet*, by McCollom and Simmonds, costing \$3.25. The second book by McCollom is *The Newer Knowledge of Nutrition*, in which he has given particular emphasis to the dental aspect. You will note in the last two chapters he has shown the relation of some of the nutrition problems to dentistry, and it will answer some of the questions you have often asked.

PRESIDENT'S ADDRESS*

BY A. A. SOLLEY, D.D.S., SAN FRANCISCO, CALIF.

MEMBERS of the Pacific Coast Society of Orthodontists and visiting friends: It is with pleasure that I extend to you a word of welcome from the Society.

Generally it has been the custom of the presiding officer in presenting his address to give a general resumé of the most promising ideas brought forth during his year of office. I feel that the various subjects are being well taken care of by the Sections at their quarterly meetings, therefore I will try to present a few ideas for consideration outside of corrective treatment of our cases.

The officers of the Northern and Southern Sections of this Society, together with their members, should feel a source of pride in the showing made during their first year, in what has been accomplished and in the interest shown in our gatherings.

The Oregon-Washington Section has as yet been unable to make definite strides due to the great distance separating its various members. We sincerely hope some means will soon be found to overcome their difficulties.

The Society is the first subject for consideration and I wish to touch upon its purposes, aims and benefits.

What are the chief purposes of a Society? First, high principles—the main factor in maintaining the dignity of our profession—these principles being inspired through mutual association. Next, the exchange of ideas, the report of failures and successes, and our deductions from the same. In the expectation of finding something new, and through the practical and scientific analysis of our combined ideas, we are enabled to be of better service to our patients. The widest strides possible are necessary to gain these ends.

Today we embrace in our Society three Sections: Southern California, Northern California, Oregon and Washington, each section meeting three to four times a year. In addition to this we have our Corresponding Membership.

In each Society certain minds are more active than others and their ideals are more efficiently placed before us; subconsciously we are more or less influenced by their lines of thought. Through our corresponding members, who should be chosen wisely, new thoughts and ideas are being introduced to us from near and far, for it is said that a stranger in our midst always creates interest.

To promote the best interest at our annual meetings I would suggest that a definite plan of study be laid out along systematic lines. Selective

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subjects towards this point could be assigned to the component Sections for their study during the year, their findings to be presented at the annual meeting in a scientific way.

A committee could be appointed in each Section to report on the papers of interest published during the quarter, that ideas of importance may be discussed at the Sectional Meetings.

Personally, I should like to see this Society, as a body, visit some of the other well-known societies, thus creating and cementing a bond of interest and good fellowship. This may be idealistic, but I feel it would produce a meeting of vast interest and a deeper study of our work. In other words, I am asking for a "get together" movement, a more general mutual understanding, instead of individualism in both the conduct and practice of our work. Fellowship is what we want.

In conducting your practice, have you ever stopped for self-analysis?

Are you commercializing your work along factory production methods?

Do you know your capacity regarding the amount of work it is judicious for you to undertake?

Did you ever hear of Selective Orthodontics?

Do you unconsciously guarantee results?

Are you conservative in what you expect to accomplish for your patients?

Do you conserve your time by giving the public to understand it is valuable, thus creating a feeling of confidence and respect in their minds?

The value of service is an interesting subject. Are we on the same standard as the medical man? I am afraid not. The public today looks upon our work as merely the movement of teeth; our work in this way is not given the standard to which it is entitled.

Take any minor operation performed by a surgeon—slight though it may be—is he paid on the basis of his time consumed, or is he paid on the standard of value of service? You know the answer—give it some thought. Educate the people to the problems of successful orthodontia and away from mere mechanical tooth movements.

Selective Orthodontics is merely a coined phrase, but in the acceptance of cases I feel that we should weigh carefully the problems of each case, and then balance these against the psychologic factors of patient and parent. I believe many times we undertake cases for treatment when we know positively that conditions are against us. We do this, hoping to do some good. These partial successes are very seldom appreciated by the public, and we in turn lose prestige.

"Do you guarantee your work?" How often have we heard that phrase? We answer truthfully and a full explanation is given to the patient, but how many times in accepting work do we do so without explaining we can do only so much, that we are only human, that it is impossible for any conscientious orthodontist to absolutely guarantee his results.

Factory production methods, as a subject, may seem out of place in our specialty, but think a bit upon this idea and I feel you will grasp my meaning. The foundation of the success of orthodontia was laid by men at

a time when the pressure of work was not so great as it is today. The consequence was that more time and closer attention was given to the problems of each individual case. I feel more pride and personal satisfaction was derived from each success. In other words, gentlemen, do you not think that perhaps for the ultimate good of orthodontia fewer cases might be undertaken at one time, thus enabling us to give a higher character of service and uplifting our profession to the higher plane which it deserves?

DISCUSSION

Dr. A. A. Suggett.—I was interested in the points the President brought out. His suggestion regarding the line of activities the Society might profitably engage in was especially good. In the subject we have been discussing, i.e., Dr. Millberry's outline concerning the teaching of orthodontics, we should be able to lean heavily on the Society to help us work out our problems of teaching. This is a new departure. It is almost impossible to major in orthodontics at present in a four-year course. The credits the dental student has to make are far in excess of what they are in other departments of the university, so in order to do effective work in orthodontics, we have to add another year there, and concentrate on that. If the Society will appoint a committee that will take hold of this matter vigorously and outline some plan, it will be of great advantage to us in working out the curriculum.

Dr. John R. McCoy.—I was much interested to hear Dr. Solley lay stress on what he terms "Selective Orthodontics." We could no doubt, have a most interesting field of practice if we could select our cases, and probably would get a good deal more credit from the general public if we could thus select our cases. We would be known as the "great doctor"—the cases would be promptly completed and perfect results attained, and the future would be rosy for us. I wish it were possible and right to conduct our practices along those lines. However, for the benefit of the general public I think we should do the best we can for some of these other cases, and not guarantee results. I can well remember some of my most difficult earlier cases, in which I am sure I would have given my word as a guarantee had I been asked to do so.

A CONSIDERATION OF THE ECONOMIC TREATMENT OF DECIDUOUS TEETH*

BY J. CAMP DEAN, D.D.S., OAKLAND, CALIF.

IT is with fear and trembling that I present this, my first paper, before the Pacific Coast Society of Orthodontists. I have no eminent standing as a man of science. I have no great skill in the field of mechanics, and my financial standing does not warrant economic advice. I have a great interest in the dental profession and its problems, and a deep and abiding faith in and a love for humanity. The physical welfare and moral training of a child appeal to me as a vital force in the progress of our state and nation and the world today. In this development orthodontia plays a part in constructive work.

Normal occlusion in a child of thirteen years is a rare thing.

A large percentage of those not normal have a masticating ability that is serviceable and an appearance that is not objectionable.

A large number of children have an occlusion which will not permit anything like efficient mastication. Beginning many times even previous to the eruption of the first permanent molars, this condition grows steadily worse until the child, grown to maturity, carries a physiognomy resembling Bud Fisher's caricature of A. Mutt or George McManus' Mr. Jiggs. It is this class of unfortunate children in which I am deeply interested. And in order to be of greatest service we must get them at an early age.

Orthodontia has a definite service to perform for humanity and we, as a Pacific Coast Society, and as a body of skilled men devoted in our love and loyalty to our fellow man, should make some beginning to grapple with the problem as a whole.

Orthodontia, since the beginning of the specialty, has been known as a very exclusive art to be practiced only on the few who happen to be supplied with the necessarily high fees which have been charged. Dentists have only referred those patients which they felt were financially able to afford such luxuries or extravagance. The average dentist does not think it necessary to call a mother's attention to a bad case of malocclusion and the fact that perhaps a specialist might in a few months completely alter the condition, unless he knows that their financial condition warrants such advice. Would he admit that dentistry is such a luxury? Would he say to a child with bad teeth, "Let them rot and be pulled out and wear plates, unless your father has ample means to pay for saving them"? No! Dentistry today is a necessity and is so regarded by the public. "A private dentist, if possible, a clinic if necessary, but Save Your Teeth," is the invariable

*Read before the Pacific Coast Society of Orthodontists, San Francisco, Calif., May 14-15, 1923.

advice from dentists, school authorities and the average laymen. Do we believe that orthodontia has reached the necessity stage? I am sure we do not. We will be the last group of those laboring for child welfare to accept this fact, for various reasons. We know the difficulties of the work, some of the causation factors, the long time required in treatment, and the limitations of human nature, but school nurses, social workers, etc., are clamoring for the correction of some of the awful teeth conditions they encounter. I have been told by several mothers who had made great sacrifices to have a child's teeth regulated, that they appreciated the fact that their dentist recommended them to come. One said, "Doctor So and So saw at once that Johnnie's teeth were not right. He is a progressive dentist." No! we would not admit that orthodontia is a necessity. People will live and have a degree of health and prosperity and raise children and even be happy with very abnormal teeth relations.

But are we not ready as a profession, to come down from the treatment of a few, to a study of some practical helps to a large number? If we could take care of the average patient in the average dentist's practice it would popularize the science of orthodontia. If we could step into the schools and carefully examine the children of the first grade or the kindergarten, then select those cases definitely determined as the beginnings of malocclusions easily correctable, and hold a conference with parents by appointment, would we not be rendering a service that would be appreciated?

Preventive orthodontia is of vast importance to the general health and appearance of the individual. "A large percentage of nose and throat and sinus troubles would never occur. Caries of deciduous teeth would be detected and diminished. Permanent teeth would be more immune to disease. Mastication would be better performed. Better digestion and assimilation would result. Pyorrhea of later years would be greatly diminished. Alveolar abscess and all its dreadful sequelae would be lessened. The opsonic index would be kept higher and many childhood diseases of extraoral origin would be avoided."*

There is a well-defined movement in the schools of California to care for the physical development of the child. Nutrition classes are in operation and Boards of Education are employing dentists to prevent retardation on account of the teeth. The whole structure of health, digestion, and assimilation rests upon a perfect denture. This is especially true of the deciduous set as they are rendering service during the "formation of the complex organism with its adjustment of structure and function."† Food material is supplied to build new bone, muscle, blood and brain. "Alveolar tissue development is especially susceptible to poor nutrition and is easily arrested." Malocclusion results as a lack of bone development at the proper time.

Orthodontists are presented with the problem of raising a child, who has inherited weakness, to a proper standard of development. This can be

*Dr. C. M. McCauley—*International Journal of Orthodontia*, October, 1921.

†Dr. S. E. Johnson—*International Journal of Orthodontia*, October, 1921.

done by proper nutrition, environment and artificial stimuli. There is a place for us, and we will be welcome by the side of the medical men and the Antitubercular Associations working with deficient children. We must recognize pathologic processes and antagonizing forces.

How can we care for more patients than we do at present and give attention to these things of general welfare nature? By studying simple practical methods; by being able to lay our fingers on the exact cause of the trouble and correct that and let much that we are trying to do and unnecessarily, fall to Nature's hand. Just as a motor expert in a few minutes corrects a defect of an automobile that perhaps is interfering with the pleasure of a whole family, or a great commercial truck that cannot proceed with its load, and permits all the other intricate machinery to function, so I would have an orthodontist study a child, quick to call a physician or a dentist, or a dietitian, or optician, or to use his own skill to correct a defect.

I have in this paper just one suggestion to offer which has made my work easier and quicker, and enabled me to make a total charge much less than if full appliances and the regular routine had been used.

If the permanent incisors do not maintain their proper position before eruption and begin to crowd and rotate and overlap, some additional force is necessary to expand the arch and relieve the pressure causing it. The dominant factor in a great majority of these cases is the maxillary deciduous canine. These little teeth are to the deciduous set all that is so well recognized in the permanent canine. By expansion in this region the pressure crowding and rotating the maxillary incisors struggling to erupt is relieved. Fitted down over the mandibular canines like a cruel trap they hold them, and the earlier erupting mandibular permanent incisors in a vise-like grip. We were taught in the earlier textbooks at college that the mandibular teeth erupt first and act as a mold over which the maxillary jaw is formed. This is not true. The maxillary canine fixed solidly in the skull, is by far the most dominant tooth, and, as we all know, requires the combination of a large number of other teeth as compound anchorage to control it. All that the maxillary permanent canine is to the permanent teeth, the maxillary deciduous canine is to the deciduous teeth, and the permanent incisors. I have found it impossible to expand them by treating the mandibular arch as has frequently been advocated. It simply brings about extreme super-occlusion, soreness, lack of mastication and the early loss of the mandibular deciduous canines. This is a decided loss to normal development, and requires holding the spaces by some form of appliance longer than necessary.

On the contrary if the pressure of the maxillary deciduous canine, which is hitting the mandibular like a trip-hammer a thousand times a day, is removed the mandibulars will expand by the force of the eruption of the permanent incisors and the tongue pressure. This entirely removes the necessity of a *distal position* of the mandible, and the appalling number of distocclusion cases will be lessened.

There are three ways I will mention of expanding the canines, viz., by the labial arch and ligatures, the lingual arch and flexible finger springs,

both attached to molar bands, and a direct wire, either labial or lingual, soldered to bands on the teeth, or resting in tube sockets and having force applied by the wire stretcher.

The labial wire and wire ligatures are effective but unsanitary, and painful on account of the constructed necks of these teeth. The lingual finger spring is effective and has the advantage of not limiting growth as Dr. Mershon has pointed out. But it is often painful as the delicate wire slips root-wise during mastication. Like the labial wire it requires adjustment of molar or second deciduous molar bands, and interferes with the child's comfort in normal mastication. Where expansion of posterior teeth is necessary this cannot be avoided. But I maintain that in children from five to seven years of age the eruption of the incisors is the chief consideration, and as Dr. Dunn recently pointed out arrested lateral development in the molar region due to muscular activity of the base of the tongue is rare. Any interference with the posterior teeth may be deferred until a later period in a great majority of cases.

You cannot regulate the teeth of a little child without his consent. The most ungovernable child with some intelligence can be interested in the work you are going to do. If you can avoid making him "open wide" and fussing around in the back of his mouth, he will not rebel. He likes the appearance of the little gold bands on the canines. They can be made almost entirely on the stone models, although I want the patient sitting in the chair while they are being made. Expanding the arch does not take a minute at each treatment. He is in and out of the chair before he realizes what is happening, and soon looks upon it as a hardship if he cannot come at his appointed time. Usually, in about three months, the canines are expanded sufficiently to release the erupting maxillary incisors and the overbite on the mandibular canines. They must then be held until the incisors are through the gums and into the space enough to hold without rotating. The bands are then removed and the case placed under observation until the second dentition of sixteen teeth is under way. If normal conditions have been restored this will be three to four years. When the baby molars are lost and the permanent canines and premolars begin to erupt, we have a critical period. It is not surprising, where interference was necessary for the proper eruption of the incisors, that some irregularity might develop in the second period. But this is another story. I will only say that it is far easier, both for patient and operator, to steer the erupting premolars into normal occlusion than to loosen them up and regulate them after they have locked in malocclusion.

DISCUSSION

Dr. T. R. Sweet.—Dr. Dean has given us a very interesting paper on the economic treatment of the deciduous teeth. There is no question in my mind that there is a great economic problem facing us as dentists and as orthodontists. The great loss to the public comes through neglect, ignorance and bad advice from the dentist. Through the elimination of preventable illness due to these causes years may be added to the life of the patient. Just how many of our adult ills may be eliminated and how many years added to our

lives, it is hard to estimate. In many ways the deciduous denture is of vastly more importance to the individual than is the permanent, for the reason that the first denture is used during the period of greatest growth and development when perfect assimilation is most necessary. The first denture is also the mould or foundation around which the permanent is formed.

Owing to this importance of the deciduous teeth, I feel that their treatment should call for the utmost skill at the hands of the dentist and that he should receive equal or even better compensation for this work than that which he performs for the adult. It takes as much or more time and material for the restoration in the deciduous tooth and requires more skill. It is also of more value when you consider its ultimate effect on the individual.

It is indeed a problem to find dentists who are capable and willing to give the class of service which rightfully belongs to the younger patients. I firmly believe that the larger percentage of the practicing dentists, even in the larger communities, are telling mothers to leave them alone, that they are not worth filling or that they will fall out. They are too much inclined to tell mother that Willie's teeth are too soft to hold fillings. If the dentists who are telling Willie's mother this were made to carry those decayed teeth around in their pockets they would be horrified, and still they advise the child to carry them around in his mouth and prepare food for assimilation with them.

The economic loss is obvious, because the conditions engendered by these practices make orthodontic treatment necessary later in life. We, as orthodontists, should be deeply interested in children's dentistry and preach dentistry and good dentistry for the child, and begin to do something to create an interest and encourage men to go into this line of work. When we do this we will have taken a long step forward in preventive orthodontia.

Dr. Dean made the statement that orthodontia has a definite service to perform for humanity and we, as a Pacific Coast Society, and as a body of skilled men devoted in our love and loyalty to our fellow man, should make some beginning to grapple with the problem as a whole. I believe that if we persuade the dental profession to take better care of the child patient, and then enlighten the public concerning the value of this service we shall have made a very good beginning. If this is done first then the orthodontic problem is much simplified.

The problem of fees has always been a rather perplexing one, and will never be settled to the satisfaction of all, as too many conditions enter into it. It is a problem that must be treated by the individual to his own satisfaction. I might suggest three points which will help in deciding a fair fee, namely: the community in which you live, the patient's ability to pay, and your own conscience. By the community in which you live, I mean that our fees should be within the means of the average resident of our community. By the patient's ability to pay I mean that our responsibility is greater when we assume a case from parents in certain walks of life than those from other walks. By your own conscience I mean that you shall give value received, whether the fee be large or small. There is no question that orthodontia has become a necessity and, when anything becomes a necessity, it should, generally speaking, be within the reach of all.

I believe, as Dr. Dean does, that we have been rather overtreating some of our younger patients. I do not believe in putting appliances on a child of five or six years of age, and leaving them in place until he is eleven or twelve years of age or until the premolars and canines have erupted. I firmly believe in the earliest possible treatment in certain types of malocclusions that become progressively worse, such as the mesial occlusion. There are many of the so-called narrow arches or underdeveloped jaws that will bear watching until the child has reached the age of eight years, or until the permanent incisors have pretty well erupted. We should keep the suspicious case under observation until a time when we are fairly sure that interference is necessary. Many cases will respond at this time with very little help while others will need help when the premolars and canines are erupting.

Dr. Dean seems to favor the wire stretcher, and I have no doubt that it is very successful in his hands. I strongly favor the lingual arch with finger springs to any other

appliance. It seems to have more of the advantages and fewer faults than any appliance I have yet used. It has the advantages of being positive in amount and direction of force; the force is continuous and easily applied, quickly removed, adjusted and replaced and can be used as a retainer.

I think the appliance the essayist speaks of (canine bands connected with an arch wire) would be a dangerous appliance in the hands of the average man, because the direction or amount of force cannot be measured, and the force applied is intermittent. It is not so easily removed and replaced, and is not a good retainer in that it has fixed anchorage which will cause a too early absorption of the deciduous root.

Dr. W. J. Bell.—I wish to make a few suggestions with reference to fees. How many of us are there in the profession who do not feel they are considered a legitimate prey for the public, regardless of its ability to pay? Not long ago a lady came into my office with a big slit in her dress sewed up with wrapping twine, exhibiting a general poverty-stricken condition. I quoted a good, stiff fee and she went on. She passed across the street, entered a Cadillac limousine and drove away. That is an exaggeration of the average case, but seriously, how many cases do we have that are poverty-stricken? The cement worker gets his \$10 to \$15 a day. If you do not believe it, start in and try to do some building. On such wages he should be able to pay something. He affords a car ranging from the little flivver to the \$5,000 limousine. But he thinks money spent on his child for orthodontia is useless. The flivver in five years' time is so much junk. So I sometimes think we waste sympathy on these people. I think we must be our own judge, and not depend on the tales told us.

Dr. James D. McCoy.—I think we have branched off from the subject of Dr. Dean's paper. I have every sympathy with some of the ideas he has presented, inasmuch as he has endeavored to view the subject from an idealistic standpoint. There is one thing certain, we need idealism in this day and age when everything is more or less in a state of chaos. The time is coming when the orthodontist must regard himself and analyze his affairs along the lines of public service. The successful physician who is really and thoroughly a benefit in the community is not always the one who receives the highest fees, but the one who gives the highest degree of public service. So the orthodontist of today must take into consideration the needs of the community and must come to the aid of children who need his services. I think that both Dr. Dean, and Dr. Sweet who discussed his paper, have emphasized these points perhaps in a different way than I am doing. It is not always a question of working for a given amount. It is a question of adjusting your fees in accordance with what your patient can pay. Some of us have gone through the developmental period of orthodontia, namely the development of the economic side of it, and perhaps have put in our years of apprenticeship. We used to take cases for much less than we do today, and we do not at the present time attract quite the same patients we used to. The people that come to a man will be determined a good deal by the community in which he lives, and by its general financial and economic condition, but I believe we would all be happier if we could work out some scheme whereby more children could be given the benefit of orthodontic treatment.

I have enjoyed Dr. Dean's paper, because he has made an effort to visualize a means whereby these benefits can be given to a larger number.

Dr. Robert Dunn.—Does Dr. Dean apply the method he has mentioned to all of those deciduous cases that come in? Do you band the maxillary canines only?

Dr. Dean, (closing).—Regarding Dr. Dunn's question, I would give Nature a chance in the mandibular arch, and usually the combined force of the eruption of the mandibular incisors with the tongue pressure will bring about sufficient expansion if you remove the interference in the anterior portion of the maxillary arch.

Answering Dr. Bell, the little fellow I referred to had been taken to two different orthodontists who had taken snap judgment and said the cost would be \$500. The mother is the wife of a laundry driver, and has ten children. The condition of that child's jaws

was such that it would have been a monstrosity later on. The cost of constructing the appliance is not very great. It takes but two sittings. I charged \$25 for the appliance and made a pretty good fee at that for the time I spent on it. I have another patient, in a plumber's family. The maxillary canines were almost lingual in their relation to the mandibular arch. I placed the appliance for the little girl, and have had the satisfaction of seeing the mandible come back to its proper position, and that is the best compensation of all.

A HOOK AND EYE OR PIN AND LOOP SYSTEM*

BY W. J. BELL, D.D.S., LOS ANGELES, CALIF.

IT is a known fact that all human endeavor is to perfect that which is imperfect, and no great body of workers ever wastes time on that which is perfect except to cheapen or shorten the process. From such a viewpoint

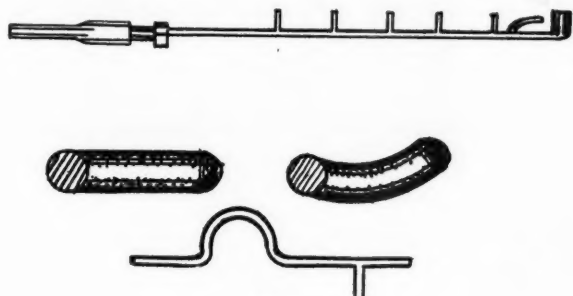


Fig. 1.

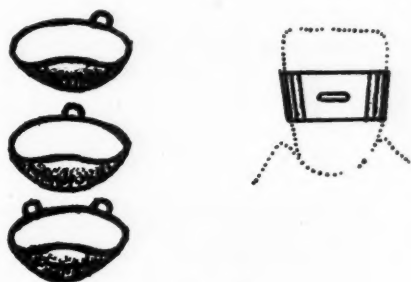


Fig. 2.



Fig. 3.



Fig. 4.

this paper on the following appliance is presented, without comment regarding its merits or demerits, and with only the necessary description.

For want of a better name, it may be called a hook and eye or pin and loop system.

It can be used for both the labial and lingual appliance.

For attaching to the molar or anchor bands the curved sheath, the tube, or the well-known half-round can be used.

Fig. 1 shows a straightened arch wire with the above described molar band attachments.

The loop shown at the bottom of the picture can be used in the above described arch wire, if needed. In the center of the view is shown an enlarged cross section of the arch wire, with the hook or pin attached.

Fig. 2 shows the eye band placed on a tooth outlined by the dotted lines.

*Read before the Pacific Coast Society of Orthodontists, San Francisco, Calif., May 14-15, 1923.

At the left is shown an end view of the eye band. On the top band the hook or eye is placed on one side to rotate the tooth.

In the middle view the eye is placed in the center of the band for a posterior or anterior movement. The bottom picture shows a double loop for moving a tooth from an angle to an upright position, either by two pins or one pin and a ligature.

In Fig. 3 is shown the molar or anchor band with the half-round attachment. To the left of the half-round attachment is a short wire pin soldered to the band; this is used as an arch lock. This form of attachment can be used with the lingual arch wire. It is more sanitary and less injurious to the gingivae.

Fig. 4 shows the method used with the lingual appliance. It is a com-



Fig. 5.

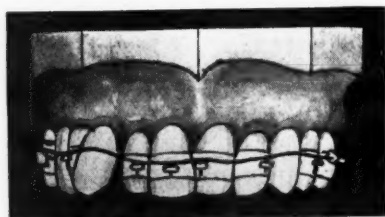


Fig. 6.

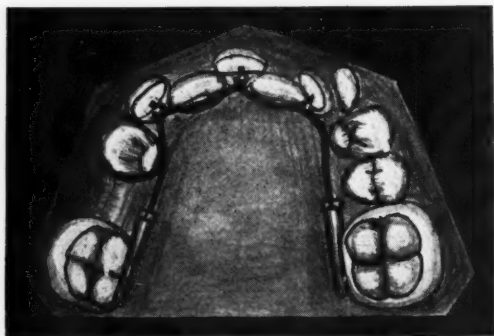


Fig. 7.

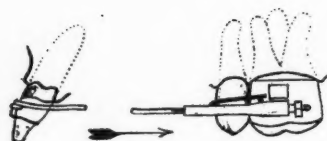


Fig. 8.

bination of the curved sheath, and the half-round attachment with the locking wire and half-round wire soldered to the sheath.

Fig. 5 shows it adjusted to the anchor band with the locking wire under the pin described in Fig. 3.

Referring again to Fig. 5, by turning the sleeve nut, a delicate adjustment can be made without removing the arch wire.

By unlocking the wire under the pin the arch wire can be removed from the mouth for any needed changes.

Fig. 6 shows the way in which the labial wire and eye band are placed on the teeth.

In Fig. 7 are shown the lingual appliance and eye bands in place.

Fig. 8 shows the method in which this appliance is used for the retraction of the maxillary anteriors.

DISCUSSION

Dr. Harvey A. Stryker.—In order to give an unprejudiced opinion of any appliance which embodies new features, one should be thoroughly conversant, through experience and study, with the fundamental principles of appliance construction and physiologic tooth movement.

Orthodontic appliances have passed through evolutionary stages in which some steps have been progressive while others have been backward. No one appliance fills every need, therefore we do not recognize such a thing as a universal appliance. Neither is there any sharp dividing line, for every one is but a compromise. It is doubtful whether a really perfect appliance will ever be constructed, for in our present knowledge, the orthodontic problem is becoming more of a developmental one, involving a serious consideration of biologic and physiologic laws. It would seem, therefore, that the appliance of the future, to be ideal, would literally have to dispense with itself long before that period which we now term the period of retention.

There are certain fundamental principles which should be duly considered in the construction of any type of appliance; they are "efficiency, simplicity, delicacy, cleanliness, inconspicuousness and stability of anchorage." It would seem fitting and proper, therefore, to enter into a discussion of this paper by first briefly reviewing the opinions of eminent orthodontists, as expressed in their writings over the past five or six years.

Dr. Mershon, in a paper read before the American Dental Association at Boston in 1920, on the subject of "Orthodontic Appliances" said, in part, "Normally, each tooth is a unit having an independent motion which is a function natural to the tooth. If we fasten several teeth together with an orthodontic appliance, or if we apply a great force to several teeth over a given period of time, those teeth are denied the function which is normal to them, and the physical tone of the bone supporting those teeth will be impaired by conflicting stimuli. The natural stimulus which these teeth are accustomed to receive through the muscles of mastication, the tongue, lips and cheeks, would be disturbed. In both of these cases an impaired function would result, and we cannot have a normal development with impaired function. This functional relationship seems to have been entirely disregarded in the past.

"If orthodontists would spend more time in studying tissue function and less on the mechanical efficiency of mechanical appliances they would have less trouble with retention. We cannot use anything we see fit to apply stimulation to teeth simply because it is mechanically perfect and efficient; it must be physiologically efficient. The profession seems to be more interested in new band material, or a material for arches, or a new type of appliance, or new instruments to be used in orthodontia. An appliance that will cause a tooth to move seems to be a sufficient reason for its adoption, with no thought as to its physiological effect."

The necessity of force control was clearly brought forward by Dr. James D. McCoy, in his admirable paper on the subject of "Importance of Simplicity in Orthodontic Mechanism" read at the 1922 meeting of The American Dental Association, when he said, "In our aim to realize the most simplified mechanism which will accomplish in an efficient manner the desired results, we should bear in mind that there are certain elemental requisites or mechanical laws, within the bounds of which we must stay. These are concerned with the force production and force control. In view of the fact that to every action there is always an equal and contrary reaction, any force or pressure applied to the teeth must emanate from a base which offers sufficient resistance to withstand the reaction of applied force without displacement. In other words, we must establish a stable and secure source of anchorage."

It is quite apparent that the appliance which Dr. Bell has shown is one in which spring loop reaction is involved. As this type of appliance construction is somewhat open to argument, it might be well to quote from a paper by Dr. Lourie read before the American Society of Orthodontists at Excelsior Springs in 1917. Referring to the "pin and tube" and the "ribbon arch" he said, "the various arch bends and twists by which force is applied in the use of the above mentioned appliances, or any other of the same

principle of force delivery, are but modified forms of spring loops and subject to the same criticism. In all of them, where several adjoining teeth are being moved, the only possibility of individual movement is in the section of arch between the adjoining teeth, before it can react on the main anchorage. Sometimes this is desirable, but often a great disadvantage. Furthermore, with all thin or small gauge arches, there is increased danger of injurious changing reaction on the main anchorage by bending of the buccal portions of the arch."

It would seem from these remarks that when we get force from an appliance in other than a straight line we are stepping on dangerous ground. It emphasizes also the use of the lingual arch as a reenforcing lever to control and stabilize our molar anchorage.

I feel that there are other men, better fitted by years of experience and more mature judgment, who can better take up the detailed discussion of this appliance, concerning its merits and demerits. I would like to point out, however, some of the mechanical advantages regarding simplicity in construction of this appliance.

The attachment to the anchor band has been improved upon; the appliance can be used as a tractor, which is not true of the pin and tube appliance; elimination of the tapered pin and tube reducing to a high degree the difficult task experienced in fitting the former; the improved three section lingual arch, allowing of adjustment, without necessitating removal of the wire; the novel idea of holding the half round shaft in the half round tube by soldering a short pin on the mesiolingual angle of the band at a point centering the half round tube, and many other features.

The development and progress of every department of dentistry has always been brought about through the capability of its members to make practical modifications of former methods of practice. Dr. Bell is making no claims for this appliance, preferring to leave the question of its merits or demerits entirely to the Society. We have had many spirited discussions in our various sectional and state meetings. "When men smile and agree progress weeps." There is no reason why we should not decidedly disagree at times and still come through with a smile. Real progress is not made by leaps and bounds. New ideas and systems are being continually built up only to be torn down in many cases.

We might conclude our remarks at this point, by telling a story about a certain man who was once asked about his church connection. He replied, "You know I have always been a church goer though I have never tied up with any particular church. I like to sample them all. Recently I have been attending the Episcopal church, and I notice they say at every service, 'we have left undone those things that we ought to have done, and have done those things that we ought not to have done,' and that fits my case so exactly that I have concluded I must be an Episcopalian."

Just by our performance many of us belong in the same class. All that we can hope is to be judged by the charitable according to our intention. If it should be contended that I have failed to follow my own maxims in any respect, I can but point to the evidences of my intentions. Throughout the discussion I have endeavored to adhere to the question of fundamental principles, to pave the way for more detailed discussion. If it has seemed that irrelevant matter has been drawn into the discussion it has been done primarily for the younger men, to more forcibly drive home the point, that *whatever other features an appliance may possess it should fulfill, as nearly as possible, the fundamental requirements of appliance construction with an equal consideration of the biologic and physiologic laws concerned in tooth movement.*

Dr. Schroeder.—I should like to ask Dr. Bell why he places a nut posterior to his tube?

Dr. Bell.—As a retractor where there is space between the premolars, etc. It is used instead of ligatures.

Dr. Schroeder.—I thought this method would tend to pull the first permanent molar forward.

Dr. Bell.—Judgment must be used in the matter.

Dr. Schroeder.—Why not use intermaxillary rubbers?

Dr. Bell.—That may be your choice. One molar cannot withstand the stress of moving eight other teeth. You run some chance of displacing the anchorage no matter what appliance is used.

Dr. Reed.—You stated you use twenty-three or twenty-four gauge arch wire.

Dr. Bell.—I use some heavier gauge wires where required. As to the band material, the best combination I have ever found is 10 per cent platinum, 10 per cent palladium, 10 per cent silver, and 70 per cent gold. This alloy is so nearly the color of platinum one can hardly tell them apart. The tensile strength is increased 50 per cent. Unlike platinum it can be burnished to the tooth and will not spring away. If palladium is omitted, the strength is lessened and it will not burnish to the tooth and hold as closely as the formula I gave you. Another point is that pure palladium will oxidize to a certain extent, but in the combination I gave you the metal can be put in the Bunson flame and will not oxidize. In preparing this alloy it is better to make it in large quantities, not less than from one to three ounces. A hydrogen and oxygen flame is required, as acetylene or illuminating gas contain carbon, and carbon should not come in contact with metals that melt at such high temperatures, or a brittle alloy will result. Carbon will unite with other elements when the kindling temperature is reached, but below that it is inert.

CHANGES IN THE NASAL AND ORAL CAVITY AS A RESULT OF ORTHODONTIC TREATMENT*

BY MARTIN DEWEY, M.D., D.D.S., NEW YORK, N. Y.

THE question of the changes occurring in the nasal cavity as a result of orthodontic treatment has received consideration from many men in the past, but there still seems to be such a variance of opinions among some prominent men that it has been suggested to me that this subject be reviewed.

We find a great many positive statements made in reference to the change in the nasal cavity by men who seem to disregard the anatomic relationship existing between these parts. We find some who claim that the correction of malocclusion or the change of the dental apparatus, has nothing whatever to do with the nasal cavity. We find others who take a position at the opposite extreme and claim that nasal stenosis and malformation can be corrected or benefited by changing the shape of the dental arch in all types of deformity. The truth is probably found somewhere between the two expressions. Some men have even gone so far as to claim that no positive proof has been presented to show that a change of a dental arch has ever benefited the nasal respiration, or produced any change in the nasal cavity. I think this statement can be disproved by a number of illustrations which I will show, and by some experiments which I have mentioned before, and will refer to again in this paper.

It is necessary to consider the anatomic structures of the nasal and oral cavity, and also briefly, the embryologic origin of those parts.

*Read before the Alumni Society of the Dewey School of Orthodontia, Atlantic City, N. J., April 25-26, 1922.

If we will take an early period in the life of the human embryo, we find that one stage in the development of the nasal and oral cavity is represented by a common cavity known as the stomodeum, out of which the nasal and oral cavities are eventually formed. The stomodeum is bounded by five processes at this early stage, which consist of the two mandibular buds, the two maxillary buds and the frontonasal bud, the latter growing down in the region of the forebrain. These structures eventually unite, leaving the stomodeum as a hole in the face, out of which will later be developed the nasal and oral cavities.

One of the things of interest to us is the development of the palatine process of the maxillary buds, which grow from the right and left sides towards the center, and under normal conditions unite in the center forming the medium suture which, in the adult is represented by the interpremaxillary, intermaxillary and interpalatine sutures. After the development of this palatine process from the maxillary buds, we have the upper cavity known as the nasal cavity, and the lower or oral cavity. The floor of the latter is completed by the development from the region of the maxillary buds.

The palatine process from the maxillary buds, therefore, becomes the floor of the nose and the roof of the mouth. The development of the nasal cavity is further complicated by a downward growth from the chondrocranium, which carries structures that will eventually be associated with the nasal septum, and in the adult consists of the perpendicular plate of the ethmoid, vomer and the structures known as the triangular cartilage. The vomer has its origin in cartilage, but is later replaced by two bones which form on the right and left side of the cartilage. So, in the adult the vomer is really made up of two bones in apposition with each other, the cartilage having disappeared.

The nasal septum growing downward from the chondrocranium, may be said to be associated with the chondrocranium as far as embryologic origin is concerned, and is very little influenced by conditions which may interfere with the development of the maxillary buds, which have been derived from the branchial arches and which are developed as intramembranous bone.

In man, we find the nasal septum consists of the vomer, perpendicular plate of the ethmoid and triangular cartilage. The nasal septum extends from the roof of the nose to the floor of the nose and divides the nasal cavity into the right and left naris. In some of the lower animals the vomer, which forms a large part of the nasal septum in man, projects down into the oral cavity and is a tooth bearing bone.

The vomer in man, with the rest of the septum, has been inclosed by the development of the palatine process of the maxillary buds until it is confined entirely within the nasal cavity, but it still has an inherited tendency to grow downward, regardless of influences which may be met with in the region of the floor of the nose. Therefore, in order that the nasal and oral cavities have their normal shape and function each one of them must de-

velop along physiologic lines, and if interfered with, either one may affect the other associated structure.

Fig. 1, which is a cross section of the head of a human embryo made through the nasal and oral cavity, shows the close anatomic relation existing between the position of the floor of the nose and the turbinated bone. It will be seen that the floor of the alveolus is very near the orbital cavity. The tooth germs are close to the eye, and no maxillary sinus is discernable at that time.

With the development of the individual the face is increased in length, the floor of the nose grows downward lengthening the nasal cavity from above downward, and increasing the length of the septum. Owing to the

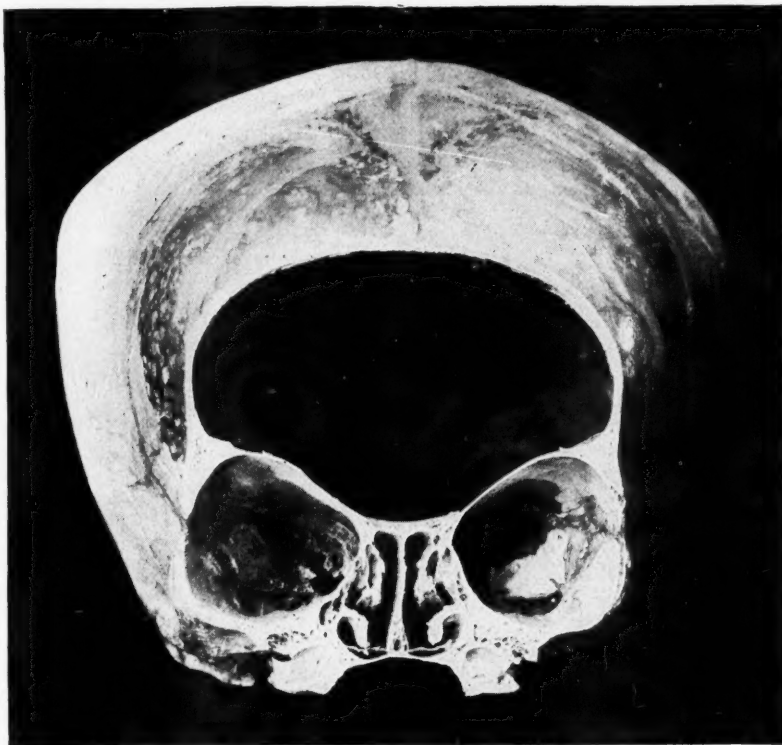


Fig. 1.

fact that the nasal septum and the lateral walls of the nose do not have the same embryonic origin, they will not be influenced by the same pathologic conditions.

For example, maldevelopment, which may interfere with the growth of the superior maxillary bone, (which forms the greater part of the bone portion of the nasal cavity) will not interfere with the development of the nasal septum, and the latter will continue to grow downward and become deflected, because of the resistance it meets from the floor of the nose.

The cross sections of the human skull in which there has been a normal development of the nasal and oral cavity show the nasal septum to be perfectly straight from above downward. (Fig. 2.) However, we find in many

individuals that the septum is not straight, but deflected. Opinions vary regarding the cause of this deflection.

We find in examining individuals who have abnormal development of the maxillary arch, and dental arches that are too narrow buccolingually, or have a high vault, often have deflected nasal septi from above downward. This has led some men to believe that the septum has become deflected because the roof of the mouth has been forced up.



Fig. 2.

It is true that the position of the floor of the nose and the roof of the nose has been responsible for the deflection of the septum, but the real condition has been that the floor of the nose has not grown downward a sufficient distance from the ethmoid bone or the chondrocranium, because the superior maxillary bone has been interfered with during development. The nasal septum has continued to grow to its normal size and having insufficient room in which to remain straight becomes curved because of this interference.

Many men, including G. V. I. Brown, Varney Barnes, E. A. Bogue and A. H. Ketcham, and Weston A. Price, have reported cases of patients with deflected septa who have shown remarkable improvement as a result of orthodontic treatment. I have seen many improvements in my own patients, and will show some case histories taken from Doctor Ketcham's practice which may bear more weight than cases from my practice.

After establishing the fact that the widening of the maxillary arch will change the position of the nasal septum, more or less dispute arose as to how this change is brought about. Some men have advocated a rapid widening of the dental arch with the idea of opening the intermaxillary, interpremaxillary and interpalatine sutures, claiming that such treatment would give the greatest nasal space and would straighten the septum more rapidly. Some have contended that by this procedure a deflected nasal septum dropped into the

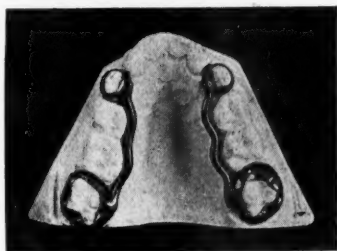


Fig. 3.

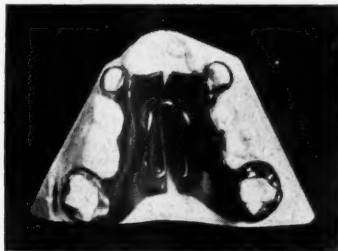


Fig. 4.

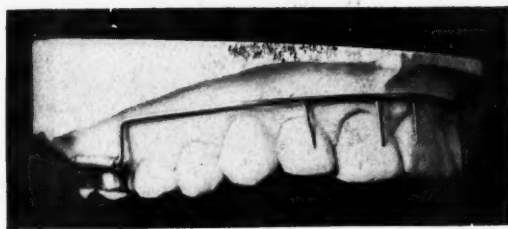


Fig. 5.

suture and two things were accomplished, namely, the septum was straightened, and by the lower part of the septum dropping in between the maxillary bones it would keep them apart and, therefore, retain the expansion.

It is my belief that neither of these things occur in cases where the superior maxillary bone is rapidly expanded and the maxillary sutures opened. In order to demonstrate to my own satisfaction the possibilities of opening the maxillary sutures, I made some experiments on dogs several years ago. I found as the suture opened the bone built in very rapidly and filled the space, regardless of the action on the septum. Of course these dogs, not having deflected septa were not strictly analogous to patients suffering from nasal and oral deformities. The experiment only proves that in widening the arch rapidly the maxillary suture could be opened.

Whether or not this is the best plan to be followed in the treatment of a patient I do not know. It does seem, from clinical cases furnished by Dr. Barnes and also by Dr. Richardson that rapid expansion with the idea of

moving the maxillary bone or maxillary teeth in masses produces valuable results.

Several years ago Dr. Ottolengui recommended the use of the rubber roof plate for expanding the maxillary arch to increase the width of the nose. Later, in some of his writings and discussions, he was inclined to question the value of his former treatment. Dr. Richardson has applied similar technic in several cases, and reported great improvement in the breathing



Fig. 6.

of the patient, benefit occurring in a very short time. Her technic is shown in Fig. 3. It consists of bands on the canines and molars and a large wire from the canine to the molar band. She makes the roof plate which is shown in Fig. 4. The vulcanite rubber plate is split in the center and has attached to each half the end of a spring wire shaped like a "W" for the purpose of expanding the teeth and dental arch. This roof plate has an advantage over the ordinary device, especially when used on the deciduous teeth, in

that it does not loosen the deciduous teeth because the pressure is applied to them in a mass, and the roof plate pushes against the soft tissue in the same manner that many orthopedic appliances do, and widens the dental arch very rapidly. If this plate is properly adjusted no irritation is produced on the soft tissue, and there is no loosening of the teeth as the dental arch is widened. If it is desired to retract the maxillary incisors that can be done by soldering tubes on the molar bands and using a high labial arch as shown in Fig. 5.

It is my belief that in young patients with deciduous teeth, suffering from a contracted dental arch and nasal stenosis, the appliance recommended by Dr. Richardson will produce a decided improvement. We must not forget

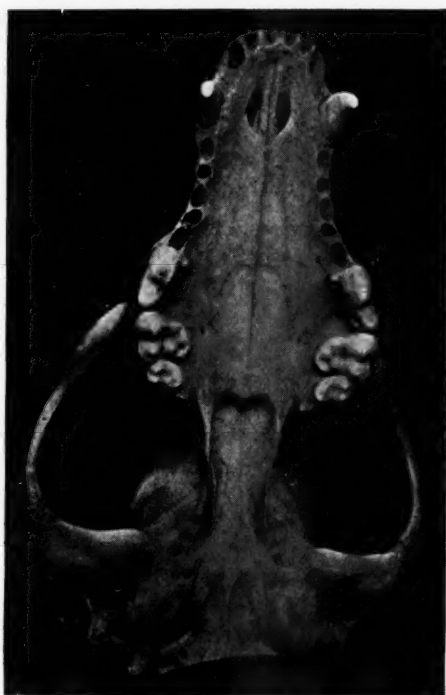


Fig. 7.



Fig. 8.

that all cases with deflected septa can be improved by orthodontic treatment. We can expect very little benefit from orthodontic treatment in those deflections that have been the result of injury and are deflected from before backward. (Fig. 6.)

In the use of such an appliance as Dr. Richardson recommends, it is probable that the maxillary suture is opened. The radiograms which Dr. Barnes showed several years ago, presented the same appearance as the dogs on which I experimented.

Fig. 7 shows a photograph of a dog in which the intermaxillary suture has not been opened by the widening of the dental arches. In this prepared specimen the intermaxillary suture can be seen; this is the normal condition that we find in the dog, and a condition similar to that found in human individuals. This suture does not normally become filled in with bone, but

there is always some connective tissue between the two bones which is a type of periosteum. The photograph of the skull in Fig. 8, which was made after the suture had been opened, shows that the bone developed so as to obliterate the normal suture. The old original lines can still be seen as well as the exact amount of new bone, although it does not show so well in the reproduction.



Fig. 9.



Fig. 10.

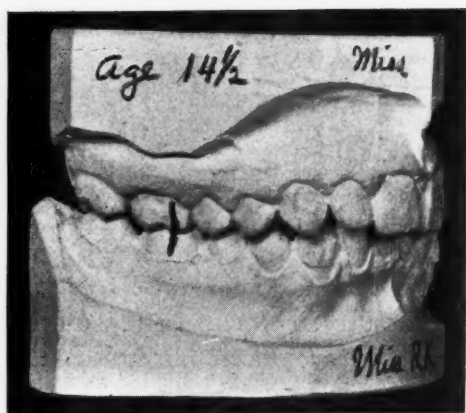


Fig. 11.



Fig. 12.

Regardless of whether we believe the opening of the suture is the proper treatment, the fact remains that as a result of orthodontic treatment the nasal cavity will be changed to a great extent. This is proved by the cases shown from Dr. Ketcham's practice, which were first reported before the meeting of the American Larynological, Rhinological and Otological Society, in Philadelphia, 1915. He describes them as follows: "You may ask: When the rhinologist has failed to establish normal breathing, how can the ortho-

dentist relieve this condition? In the first place, I will take for illustration an aggravated case (Figs. 9 and 10), from that type in which there is ample breathing-space, after adenoids have been removed, yet the child continues to breathe through the mouth. It is impossible to close the lips on account of

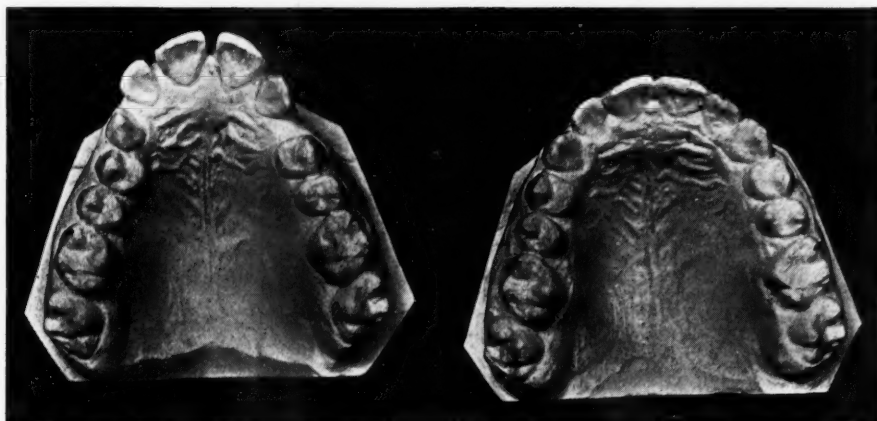


Fig. 13.

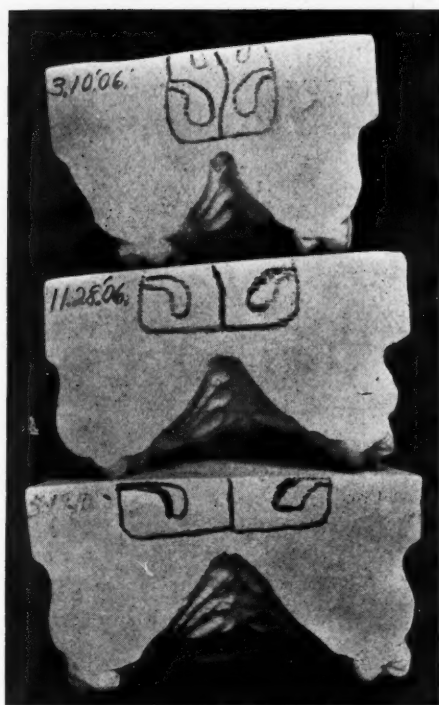


Fig. 14.

the protrusion of the upper anterior teeth. You can readily see that by reducing these abnormal relations that the orthodontist can make it possible for the patient to close the lips and breathe through the nose (Figs. 11 and 12). This also establishes a normal distribution of the forces of occlusion in the mastication of food, of tongue pressure inside the dental arches and of lip and cheek pressure outside, and the establishment of normal air pressure

in the nasal cavity. By use, the weak upper lip is developed. By eliminating abnormal exercise—in making it impossible for the lower lip to be drawn in behind the upper incisors—its thickness is reduced. The muscles which hold the mandible forward are strengthened, and the mouth is kept closed by the wearing of intermaxillary elastics from the region of the upper canine to the lower first molar. These ligatures are usually worn day and night during the active period of treatment, and at night during the period of retention, which should last until mouth-breathing has been overcome." (Fig. 13.)

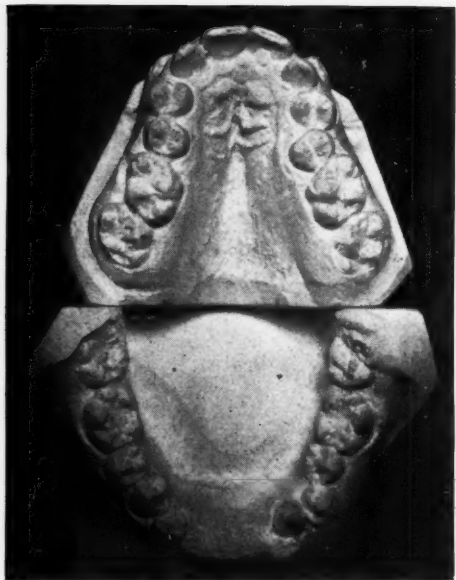
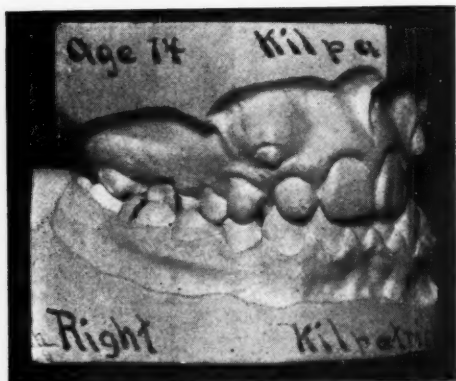


Fig. 15.

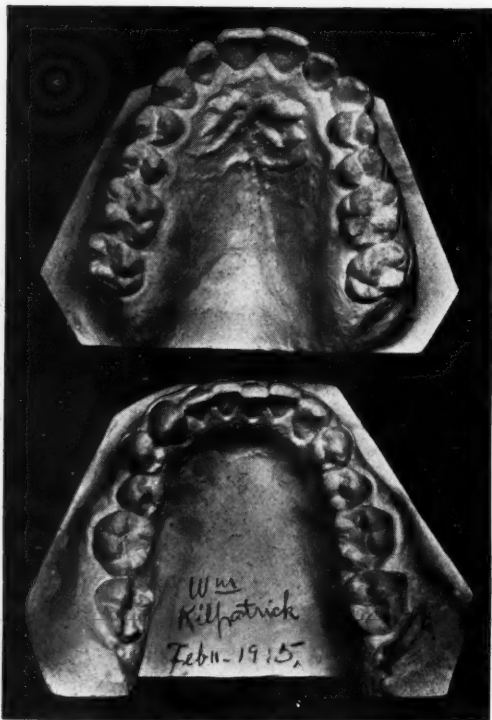


Fig. 16.

The Kilpatrick case was as follows: "Enlarged tonsils removed at six years of age; adenoids one year later, but the operations were too late to materially help the nasal space or the dental arches, for growth had been so much arrested that while removal of tonsils and adenoids prevented the case from becoming even worse, yet you see what a badly-constricted arch and what maloccluded teeth the patient had at fourteen years of age, when he presented for orthodontic treatment. The boy's rhinologist, Dr. T. E. Carmody, of Denver, reported that on examination he found the nasal space to

be about one-half normal, not only on account of narrowing, but also on account of an intumescent condition of the tissues, septum deflected to the right. It was examined at intervals of several weeks and after packing with adrenalin, the intumescence would disappear and show a narrow nasal space, which became greater as treatment progressed. (Fig. 14.) The condition on the oral side of the palatine portion of the maxillary bones was fully as bad. The distance across the roof of the mouth between the upper second premolars at the gumline was but eighteen millimeters. (Fig. 15.) The dental arches were widened and the crowns of the teeth placed in their correct positions. The active tooth movement was completed in less than a year's time. The boy, who was poorly nourished and stunted when treatment began, did not suffer, but gained in weight and health during the operation. At the end of this period he again visited his rhinologist who reported that the nasal space

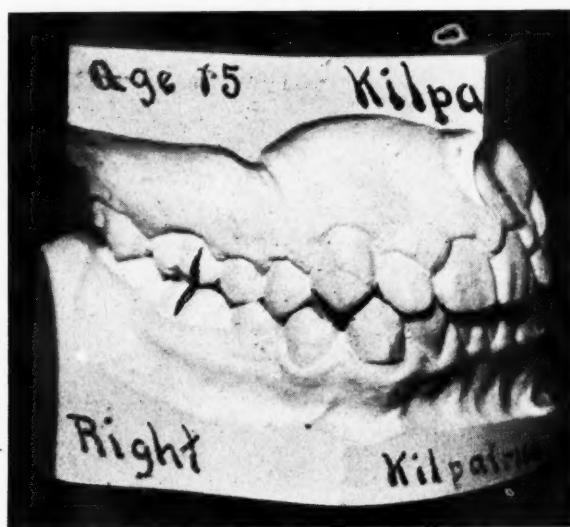


Fig. 17.

was about two-thirds to three-fourths normal, due to apparent widening of the nasal space and subsidence of the intumescence, a result of widening the maxillary arch (Fig. 16). The measurement showed a gain of thirteen millimeters across the arch. Three and one-half years after active treatment was completed his rhinologist reported: Nasal space apparently normal; septum straight, turbinates normal."

I think that the results attained in the Kilpatrick case, as reported by Dr. Carmody, definitely prove that in that instance, the correction of the malocclusion was responsible for the change which occurred in the nasal cavity. I cannot conceive of its being possible for the nasal septum to straighten out and the dental arches develop, as they did at that age, without mechanical treatment.

When the large amount of clinical evidence presented along these lines is considered, it seems conclusive to me that in a certain type of nasal deformities great improvement from orthodontic treatment can be expected.

DISCUSSION

Dr. Irving Spenadel.—There is no question in my mind that the orthodontic work done on patients with nasal stenosis benefits them, as has been shown by Dr. Dewey, but I do not believe that any change takes place in the septum in the widening of the arch.

Kopetsky and other well-known rhinologists claim that a high vault of the arch is not associated with the nasal septum, and to prove that statement they say that the nasal bones are developed between the eighth and ninth weeks of fetal life, whereas the nasal septum is developed about a year to a year and a half after birth. Therefore, there is very little change in the nasal septum, and whatever change has taken place has occurred after ossification.

In my discussion with some of the rhinologists regarding the widening of the palate from an orthodontic appliance, I find there is practically no change in the nasal cavity which will produce a greater volume of air, and the way they record that is by a mirror which resembles a trench mirror with indentations. I intend to make that test this year with the help of Dr. Dewey at the clinic, and see what we can gain from it. However, from our present knowledge I do not believe there is any direct change in the nasal cavity that will enable the patient to get a greater volume of air and help him in that way. If a patient has a high vaulted arch there is an immense thickening of tissue, and by widening the arch we improve the antral area and the position of the tongue in allowing it to come forward.

Dr. E. G. Weeks.—When I began the practice of orthodontia I put a sign "Orthodontist" in the window. It so happened that a well-known rhinologist in Saginaw saw it, and called me up and asked the meaning of the word. I told him, and he became interested. He visited my office where I showed him what I was attempting to do. Two days later he brought a boy over to the office. The boy's mouth resembled the Kilpatrick case, with a very high arch. The doctor was going to operate that day. It was almost impossible for the boy to breathe through his nose on account of a bad deflection of the septum, which was shown by x-ray. I asked the doctor if he would let me take this boy as a charity case, delay his operation, and see what I could do for him. In eighteen months' time I sent the boy back to the doctor, and by that time he was breathing freely through his nose. I sent him back to the doctor as a joke for his nasal septum operation. The doctor had really forgotten the boy, could not place him at all. The boy had gained thirty pounds in weight. I recalled the case to his mind and the doctor replied, "Really, I did not believe at the time that such a thing could be accomplished." The x-ray pictures afterward proved that the septum was absolutely straight. I accomplished the result only through the buccal expansion, and I believe an absolute change is obtained in those tissues.

Dr. Adelbert Fernald.—I think all who have seen the illustrations of Dr. Dewey and have listened to his talk realize that he has put a great amount of work and thought into this subject. There are one or two things I would like Dr. Dewey to explain when he closes the discussion. We all know he can give us more light on this subject if he wants to, and personally I want to get all I can out of him.

I have been under the impression that when a tooth has been moved out of position it necessarily leaves a space behind it. Dr. Dewey says it does not, but new bone fills in that space very rapidly. I doubt that. I may be wrong, but I want more light on that phase of the subject. If new bone fills in behind the tooth, I would like him to explain if the appliance comes off suddenly, how the tooth would drop back if new bone had filled in behind it? If new bone would fill in the space as quickly as he says it does, why do we have to place the retaining appliance on so quickly?

I would like him to explain also how soon new bone fills in the space when a tooth has been extracted—how soon that pocket is all filled in? In other words, if new bone fills in as fast as the bone becomes absorbed, how can Dr. Dewey prove it? I don't believe he can, but that is what I want to find out. I have enjoyed Dr. Dewey's remarks and illustrations very much, but I know we can get more information from him by asking questions.

Dr. Landis H. Wirt.—I would like to relate a case of a similar nature that I have under treatment. The arch was very high and narrow at the top, with the lateral incisors standing directly back of the centrals. At the time the case was referred to me we started treatment on all of the six year molars, and I have been bringing the molars forward to fill this space, expanding the anterior portion of the arch, and I have noticed the nasal spaces have gradually enlarged. The young man, now 19 years of age, breathes through his nose more freely. I have not made a close and careful examination of the nasal passages recently, but about a month ago there was a notable difference in the size of the nose.

Dr. Joseph D. Eby.—I feel that this subject which Dr. Dewey has brought forward today is one of the most vital in orthodontia. If we could utilize our results to such a wonderful extent, I believe we could render one of the greatest services any one individual could render to humanity.

My attention for the last two years has been directed toward the surgical aspect of orthodontic problems, particularly where they converge, and one or two thoughts have occurred to me in connection with the presentation of this subject by Dr. Dewey, and I am going to ask him to answer some questions for the benefit of all of us.

In reviewing the anatomy of the palatal processes of the superior maxilla, we know that the median suture curves superiorly, while the bones of the palatal process have a lateral curve. In the application of force across the surface of the posterior teeth it is transmitted through the roots of the teeth into a horizontal region, and is rather more remote and dependent upon extensive transmission. While we are expanding with a definite, positive measure of force across the crowns of the teeth, why could we not create force from above downward to the median line with a specially devised mechanical apparatus? We could, roughly speaking, pass a silver suture through one palatal process and bring the ends of the suture down at the end of the anterior portion of the palate, one toward the middle portion and one toward the posterior portion, and have it extend laterally as a means of attachment of these wires, pulling straight down. It seems to me, we could split the mucoperiosteum so that we could pull down without involving the ends.

I would like Dr. Dewey to tell us what transitional processes would be there, and whether radical surgery of this nature would be worth while in conjunction with our orthodontic cases requiring greater nasal space.

I have been actually astounded at the present practice of some oral surgeons in these United States. They will have an orthodontic apparatus in service, they will cut away the soft tissues under a general anesthetic, they will direct force against the malar process and apply heavy bands to the superior maxilla. Where these teeth are out they will put on screws and allow the tissues to move, utterly disregarding the principles of normal development and everything else. For a man to impose such a practice upon another human being is the worst form of malpractice. The man who would take money for that kind of work is doing himself and the profession a great injustice. I would like to hear Dr. Dewey's opinion regarding this matter.

Dr. John A. McPhail.—I happened to have a boy who was a mascot for a basketball team. As the boy said, he never could play. I put on an appliance (the one described by Dr. Dewey, as made by Dr. Richardson), and ever since that boy has been able to play everywhere, and it was the first time he could ever run or play. I believe what Dr. Dewey said can be done.

I would like to ask Dr. Dewey this question. If a rhinologist says there is a slight amount of adenoid vegetation in a child who comes for treatment and it is a question whether operation should be done or not, will the adenoid vegetation disappear by widening the arches? It is supposed, I believe, that the adenoids grow best when you have a narrow nose. If you can make the child breathe normally, may it not be possible to prevent the further development of adenoids?

Dr. Martin Dewey (closing).—I said in the beginning that this paper was presented because the fact relative to the change in the nasal cavity resulting from orthodontic treatment had been denied. It seems that regardless of how much evidence you present on a

subject, there are some people who are inclined to believe that such a thing is not possible. It is unsafe to say that you do not believe anything is possible, for you may turn the street corner and find somebody who does. There is no question in my mind, and one could cite hundreds of cases if time permitted, that we have conclusive clinical evidence that the nasal cavity does change as the result of orthodontic treatment.

The report made by Dr. Carmody of Denver on the changes which took place in Kilpatrick's case shows that the patient grew progressively better during orthodontic treatment, and at the end of three and a half years the nasal cavity was normal. You may say the nasal cavity would have developed anyway and that the reason the nasal cavity developed was because the boy increased in weight and health and improved while the orthodontic treatment was going on. You might say the improvement in health is what caused the change in the nasal cavity. I do not believe that is true, because the increase in health was the result of orthodontic treatment, which gave him a better masticating apparatus, and produced in the superior maxillary bone a change which allowed the nasal cavity to become normal.

The cases reported by Dr. Weeks and by Dr. McPhail are so common that it is really almost unbelievable that this change in the nasal cavity is still doubted. But you find many of the older men who have been practicing orthodontia for fifteen or more years who will stand up and say they do not believe the nasal cavity can be changed by orthodontic treatment. What they believe does not change the situation. When you get such reports as are made by rhinologists and by Dr. Weeks, Dr. McPhail and Dr. Wirt, there is something more to it than the simple statement "I don't believe it." They cannot push it aside.

In regard to Dr. Fernald's question relative to the development of bone following orthodontic treatment, I will say that the bone filled in around the canines as fast as the teeth were removed. It does in some of our patients, but not in all of them. The way to prove this is to take radiograms of a large number of these cases where you are moving the teeth anteroposteriorly, the molars forward or back. If you will make radiograms of the case before you start, and radiograms during the time you treat the case, you will find the pictures will not reveal any lack of bone in contact with these tooth roots. You will find the bone right up against them. You will find the lamina dura, the alveolus, will move along with the tooth, and you will find a nice little line between the tooth and bony socket as the result of changes occurring in the cancellous region. In the case where you correct torsion, you create considerable bone absorption, but you will find there the radiograph will also show that the bone is closely in contact with the roots of the tooth, but may have a different appearance in the x-ray than the bone around a tooth that has not been moved. The result of this is, that as the tooth is rotated the bone develops as a result of mechanical irritation, (or better, mechanical stimulation), and the spicules of bone that develop will have a different shape; and will be braced to stand a different stress under the forces of occlusion. That is the reason for postoperative maintenance, otherwise known as retention. After you have moved the tooth you have bone developed around that tooth, but this bone may change as soon as you take off the mechanical appliance. These spicules of bone have developed as a result of mechanical stimulation, and when the appliance is removed and the stimulating influence is taken away, the individual begins to masticate on the tooth; the forces of occlusion and mastication produce another change in the bony spicules. The absorption produced by the forces of occlusion after the removal of the mechanical stimulation makes necessary the building of other bony spicules, which may result in a relapse, if you depend upon the development of bone to hold the teeth. Therefore, if you have the forces of occlusion normal, the cusp relation normal, the atmospheric pressure normal, these forces of occlusion will maintain the teeth while the bony formation is changing to the character it will assume as the result of the forces of mastication.

A few years ago there was considerable discussion about moving teeth bodily, and developing bone as a result of this movement. The bone developed as a result of apical movement, and a great many dentists thought that was a solution of the problem. But the development of bone is not the solution of retention, and the development of bone will not hold the teeth.

In a series of experiments on six dogs, we opened the sutures in three, and then took off the regulating appliances. The teeth immediately went back. The bone had developed as a result of mechanical stimulation contrary to the force of occlusion, because every one of the dogs had normal occlusion when we started the experiment. The bone did not retain the teeth because the other forces of occlusion were not working with the development of the bone. In the bodily movement of teeth, if the other forces of occlusion are not normal, the bone will not remain, so do not pin your faith to retention as a result of development of bone.

In answering the hypothetical question asked by Dr. Eby about exerting downward pressure on the roof of the mouth and producing by mechanical force a downward pull on the palate, I wish to call attention again to the change which you saw occurring in these central incisors of the dog. As the canine region was widened and the osseous tissues changed, the apices of the teeth were carried apart but the crowns were not. A review of the histology of the roof of the mouth reveals that the peridental membrane is a continuation of the periosteum, or is a modified periosteum, which surrounds the roots of the teeth, and continues as an uninterrupted inelastic connective tissue membrane over the roof of the mouth and down again on the other side. When pressure on the teeth is exerted and they are moved buccally through the medium of the inelastic connective tissue, these inelastic fibers are put on a stretch, and a downward pull on the roof of the mouth is produced. A change follows as a result of the inelasticity of the periosteum, very much the same as if there were wires running through the bone. The bone will change before the inelastic tissue of the periosteum will change. The periosteum itself becomes an apparatus similar to that which Dr. Eby suggested as a surgical device for putting wires up through the palate. I think he knows that the use of wire through the palate would be useless, because the wire would produce absorption of the bone and would slough out before it could pull down the palate.

The relation of adenoids to a narrow nasal cavity, or the effect of normal breathing on adenoids, is a well established fact. If an individual has considerable lymphoid tissue in the nose and if he moves into a country or climate where the air is warmer and drier, so that he can breathe through his nose, the adenoids will invariably atrophy. That is the history of hundreds and thousands of cases of patients who have changed from a damp, cold atmosphere to a warmer and drier one. You bring about the same condition by widening the oral cavity and increasing the development of the nasal cavity, for this enables the individual to take more air through the nose. If the air passes through the nasal cavity, becomes warmed to a certain degree and passes over the adenoid tissue, the result is that the adenoid tissue disappears.

I had a very amusing incident occur in the case of one of my patients, the members of whose family were Christian Scientists. The child had a very well developed lymphoid tissue which I insisted should be removed. I absolutely refused to begin orthodontic treatment before the adenoids were removed. The mother, who was a Christian Scientist, assured me that she could take care of these adenoids herself. I figured that the most diplomatic thing to do was to start orthodontic treatment first, and then if it developed that these adenoids had to be removed, I could talk to her much more forcibly with the appliance in the child's mouth. I started the case with that idea in view. As the orthodontic treatment progressed the child's breathing improved, and in six months seemed to be apparently normal. The Christian Scientist mother took the credit for having removed the adenoids through faith. The adenoids atrophied, the breathing of the child became normal, and the normal function of the nose was established. She claimed the credit, and so did I. At any rate the child was benefited, regardless of the factor responsible.

DEPARTMENT OF ORTHODONTIC TECHNIC

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ELEMENTARY ORTHODONTIC TECHNIC

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(Continued from December, 1923.)

REMOVABLE APPLIANCES

OF the various types of removable appliances used for the correction of malocclusion the Jackson removable is easily the most outstanding. This type of appliance was originated and progressively perfected and developed by Dr. Victor Hugo Jackson of New York, who has practically spent his professional life developing a removable appliance which would permit of periodical simple removal in order that the teeth and investing tissues might receive thorough prophylactic care during orthodontic activities.

This conspicuous feature and principle is entirely opposite to the fundamental principle of the fixed types of appliances which are securely anchored and cemented to the teeth and can only be removed by the operator with some considerable effort, by disengaging the cemented surfaces from the teeth to which the appliances are attached.

Desirable and attractive advantages which are claimed by advocates of the removable appliance are first and foremost as above pointed out, the prophylactic care which may be given the tissues while under treatment, incident to the possibility of entire removal of the device from the mouth. In addition, Jos. Eby has pointed out many advantages, which are as follows:

"Mechanically, the modern Jackson apparatus requires a mastery in technic of construction, more so, perhaps, than many other appliances which embody similar principles but when once the skill is developed by the operator, the following advantages are to be found:

1. Relative ease of construction.
2. Great latitude of design.
3. Ease of insertion.
4. Exact control of stimulation.
5. Ease of alteration to meet advanced conditions.

6. Durability.
7. Favorable location.
8. Remarkable balance between the problems of anchorage and applied force.
9. Comfort to patient and operator.
10. Accurate control and adjustment.
11. Hygienic.
12. Volume and quality of production.
13. Excellent retainer.
14. Aids the forces of occlusion.

"There are many other salient points about Dr. Jackson's appliance, one other, at least, to which I desire to call special attention. In the majority of malocclusions, there are certain segments in arches, particularly in the posterior regions, wherein certain groups of teeth are in correct relations and if they are shifted en masse, the phenomenon produced in the alveolus is altogether different from that made by an appliance which acts against the teeth individually.

"In the Jackson apparatus, the side arms or the extended 'finger' springs may be made to engage groups of teeth so as to transpose them in a block movement.

"Radiographic observation of this condition invariably reveals the fact that the socket lining, the lamina dura, or the pericemental lamella, remains intact and tooth movement results from the absorption of more cancellous alveolus adjacent. In comparing this advantage with the individual tooth movement, some of the following facts are suggested:

1. Movement expedited.
2. Teeth retain alignment.
3. Dentinal ligament, peridental membrane, laminated socket lining uninjured.
4. Retention more rapid and assured."

The impression seems to have gained momentum among many who are not entirely familiar with the technic of manipulation and adjustment of this type of appliance that its manipulation in practice is a rather simple, crude sort of procedure. Contrary to this assumption, however, the *proper* technic and operation of the true Jackson device is one of a highly technical nature, in fact much more so than is the manipulation of some of the so-called fixed appliances and calls for a most thorough and complete understanding of dynamics, particularly principles of wire bending, spring tension and reciprocation of stresses.

The appliance under discussion by its very nature, and being made entirely indirect, unfortunately has been woefully and shamefully imposed upon by the ludicrous stage setting in which it has been placed through the advertising pages of many of our even representative and official dental journals.

Jackson gave to the dental profession the results of a lifetime of effort

in developing a removable appliance, the technic of manipulation of which must be mastered and studied zealously if an operator expects to obtain even mediocre results. It is most unfortunate that the removable appliance and its real merit has been cheapened and criticized as a result of propaganda carried on by those who have made a business of merchandising the removable type of orthodontic appliances.

There is a story told by one of our dental supply houses which is in effect that an elderly lady walked into their place of business one day along with her little grandson. She pulled aside her little grandson's lips to expose to the courteous dealer the little boy's "crooked teeth." She then asked how much it would cost to buy some "braces" to straighten them, explaining that it would be necessary for her to do the job herself inasmuch as she did not have the necessary funds in order to employ her dentist to do it for her; further that she had been told by the dentist that there is a "brace" advertised, "that all you had to do was to place it in the mouth,

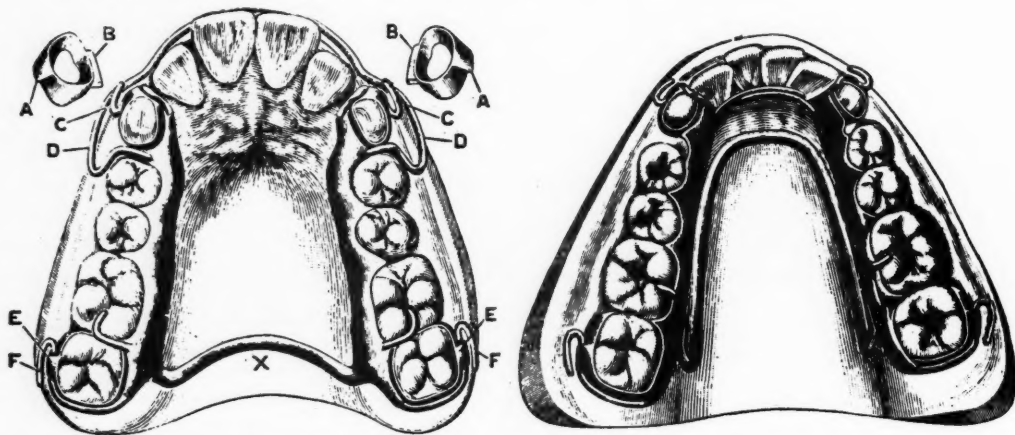


Fig. 43.—(Jackson.) The Jackson removable appliance as advocated and used by Jackson.

give it a little time and the 'brace' would do the rest." Similar is the story of orthodontic appliances today to the uninitiated. It requires decidedly more foundation to successfully treat malocclusion than a brace, and he who buys the brace, thinks brace, talks brace, and nothing more, is not in a more advantageous position than the elderly lady with her grandson, insofar as ultimate results are concerned.

The removable type of appliance at its best has never attained considerable popularity among orthodontists. Some of the principal points which are raised by its opponents are as follows: Removable appliances have been used and constructed almost entirely of base metal, the solder used being of pure tin, consequently, they are large and bulky. The advantage claimed by its advocates, that of being removable, is pointed out on the other hand by its opponents to be a decided disadvantage, inasmuch as being susceptible of removal by the patient it is many times removed when causing slight annoyance, is lost or distorted, thereby necessitating entire reconstruction. It is pointed out that the difficulties of use in conjunction with the intermaxillary anchorage are quadrupled, when compared with the fixed appli-

ance; that the question of breakage and distortion during treatment is discouraging; that the delicate occlusal relations of the teeth during treatment are interfered with unless the most careful and minute pains are employed in technic of construction and extreme pains used to prevent distortion of the anchor clasps.

In Fig. 43 may be seen an illustration of the Jackson removable appliance.

For reading upon the more recent technic of the Jackson removable appliance, "The Principles of the Jackson Removable Appliance" by Jackson may be referred to in *Internat'l. Jour. Ortho.*, April, 1921, vii, 175, (also) "The Evolution of the Principles of Appliances" by Eby, *Internat'l. Jour. Ortho.*, ii, 184, 246, 330, and 481.

Within the last few years a new type of removable appliance made of precious metal has been advocated by Crozat. As to what degree of popularity and success this appliance has enjoyed in its short history, I am not informed at this time.

(To be continued.)

DEPARTMENT OF ORAL SURGERY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

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THE VALUE OF THE DENTAL HYGIENIST TO THE ORAL SURGEON*

BY THEODOR BLUM, D.D.S., M.D., (PENN.), UNIVERSAE MEDICINAE
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Oral Surgeon, Dental Service to Bellevue Hospital; Cons. Oral Surgeon, Hebrew Orphan Asylum of the City of New York and Hospital for Joint Diseases; Chief, Dept. of Oral Surgery, United Israel-Zion Hospital.

THE practice of dentistry today without the cooperation of a dental hygienist is inconceivable. By practice of dentistry is meant dental surgery in all its branches, one of which is oral surgery. While in general dentistry, oral hygiene is practiced as a part of general hygiene for the prevention of disease, particularly caries, it is mostly of prophylactic value in oral surgery to insure an uneventful postoperative recovery and to prevent local and general complications.

While comparatively speaking, infections due to injections for local anesthesia are very rare, still it seems only logical to see to it that patients receive the proper prophylactic treatment beforehand so as to absolutely exclude the possibility of debris being carried into the tissues with the hypodermic needle. In other words, injecting anesthetic solutions into the tissues of a mouth whose gingivae and teeth are covered with infected material, is bad practice.

More serious, of course, is this matter if a general anesthetic, particularly ether or chloroform, is to be administered. There is no doubt in the mind of the author that most postoperative pneumonias are due to the fact that hygiene of the mouth, nose, and throat were neglected. Therefore, it should be a rule in every hospital that hygiene of the above-mentioned parts must be instituted in those patients who are to undergo an operation under a general anesthetic. Only emergencies are the exception, when a thorough swabbing of the oral cavity with argyrol (25 per cent) will have to suffice.

*Read before the meeting of The Dental Hygienists Assn. of Columbia University, November 7, 1923.

More than fourteen years ago, when I was yet an undergraduate in medicine, I felt the importance of this subject. I wrote a letter to the Medical Board of the University Hospital recommending the appointment of dental internes who should see every patient as soon as admitted, subject him to prophylactic treatment and take care of any temporary work which might be indicated. Naturally, the receipt of the letter was acknowledged, but the recommendations never adopted. At the present time, however, when the dental hygienist has come to stay, there is no excuse for an institution to neglect this important one of its duties. Can any person of normal mind fail to see the importance of oral hygiene? Is there anybody, who believes a patient, medical or surgical, can get along better with a filthy mouth?

To show the importance of the hygienist to the oral surgeon think of the many cases of fractures, both of the mandible and maxilla. Before a splint is inserted or the teeth wired, the mouth must be cleaned. During the treatment which usually lasts from six to eight weeks, the patient should be seen by the hygienist as often as indicated. If the so-called "Army Method" of wiring* is used or removable splints or the sliding joint (Gleitschiene) of Schroeder are employed,† the task of cleaning the teeth on the lingual and palatal aspects as well is made possible.

To mention another type of case, I wish to call attention to the infections developing in the pockets of partly erupted teeth, especially third molars. Here often an ulcerative stomatitis develops. Surgery is not indicated until the acute infection has subsided. The periodontist and hygienist will accomplish this in a few days.

There are a number of oral surgical diseases, which cannot be taken care of properly without the assistance and cooperation of the dental hygienist.

Patients suffering with osteomyelitis of the jaws, especially the mandible, which infection oftentimes lasts six months and longer, must receive prophylactic treatment at regular intervals being unable to take care of it themselves. The unfortunate ones afflicted with malignant diseases of the mouth are not only made more comfortable, but the tissues heal much better after operation if the mouth is clean (Bloodgood). The hygienist will have to see these patients quite frequently during the time they undergo radium and x-ray treatment.

These are only a few instances illustrating the necessity of oral hygiene in oral surgery. It is evident, however, that no matter what the operation, best results can only be obtained if the field of operation, the mouth, is clean.

Considering it very essential, the author again repeats, that aside from the fact that everybody should at regular intervals receive prophylactic treatment, every sick person (whether in a hospital or treated privately), every case that is to take a general anesthetic and most certainly everyone

*"Notes on Oral Surgery," reprinted from the Journal of Allied Dental Societies, December, 1918.

†"Oral Surgery with Special Reference to Difficult Extractions," reprinted from the Dental Items of Interest, 1916.

who will undergo an operation upon his mouth, nose or throat, must have the mouth and teeth in as perfect a condition as circumstances will permit.

To sum up, the value of the dental hygienist to the oral surgeon is manifold, particularly in taking care of patients before an anesthetic is administered and in preoperative and postoperative prophylaxis.

How highly the author values the dental hygienist and how much faith he has in the service she gives to humanity, can be appreciated from the following paragraph taken from his paper on "Oral Focal Infection from the Standpoint of an Oral Surgeon" read before the meeting of the Alumni Association of the Department of Dentistry, University of Buffalo, March 21, 1919,* which is as follows: "As soon as the research work in this subject (oral focal infection) will be done by competent men only, and their findings alone seriously looked upon by the medical and dental practitioners, more light will be thrown upon this field for the benefit of both the suffering patients and our profession as well. Our hope, however, does not lie so much in the future accomplishments of this research work as in the enlightenment of both the profession and the public on one hand and the legislative bodies on the other, in regard to the paramount importance of oral prophylaxis. Oral prophylaxis systematized and well established would unquestionably free the coming generation of the menace of oral focal infection."

Every dental hygienist should serve a one-year internship in a hospital right after graduation as every dental graduate should. Is it so far-fetched a thought that the dental hygienist, well trained in clinical oral pathology, will be in a position to recognize the earliest lesions suspicious of cancer before operative interference as well as radium and x-ray treatment have passed their usefulness, and thus save thousands of human sufferers from an untimely fate? On the other hand, every oral surgery clinic must number among its staff a dental hygienist, and if possible, every oral surgeon should employ one in his office, if enough cases accumulate. The practice of oral surgery today without the cooperation of a dental hygienist is inconceivable.

140 WEST 57TH STREET.

*Reprinted from the Journal of the National Dental Association, December, 1919, vi, No. 12, 1147-1151.

DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

Edited By

Clarence O. Simpson, M.D., D.D.S., and Howard R. Raper, D.D.S.

DENTAL RADIOGRAPHY*

BY JOHN D. MILLIKIN, D.D.S., F.A.C.D., SAN FRANCISCO, CALIF.

THE x-ray has been used in dentistry for about one-quarter of a century, but only during the last ten years has it been universally used. The courts have recently decided that the use of the x-ray is included in the average amount of skill in the practice of dentistry. The average amount of skill is always required by law, and in any suit for malpractice the use of the x-ray is essential in most cases to prove that the average amount of skill had been used. This being a fact, it is difficult to believe that many dentists persist in stating that they have little use for the x-ray in their practice, although the progressive ones demand a complete set of dental radiograms of all their patients before assuming the responsibility of the care of their teeth.

Manufacturers of dental x-ray machines years ago saw the future of dental radiography and, as a result, many of these machines were manufactured. Some of the first were dangerous to use, and at this time when they have developed to the present efficiency, little instruction is given to the purchaser. In many cases the only instructions given were to—"Push the button and the machine does the rest." This often resulted disastrously, for a burn to the patient or dentist meant a suit for damages instituted by the former, or an injury to the latter that might seriously interfere with his practice.

This applies also to the lay radiographer who purchases a new machine and is totally without knowledge of the power of the x-ray when he begins the practice of dental radiography. One x-ray machine salesman was heard to remark after selling a machine to a man desiring to open an x-ray laboratory: "If that fool does not kill a patient or himself it will be a wonder."

Dental schools are now teaching dental radiography and several textbooks have been written on the subject. It is safe to say that of the fifty thousand dentists in the United States, not over ten per cent know a great deal about dental radiography. It has been suggested that the members of the dental

*Read before the Third Annual Meeting of the American Society of Dental Radiographers, Cleveland, Ohio, Sept. 7-8, 1923.

profession avail themselves of every opportunity to take post-graduate study in dental radiography, not only in the uses and dangers of the x-ray machine, but also in the interpretation of the dental radiogram. It is believed that a large percentage of the dental radiograms are now being interpreted, at least in part, by others than dentists (physicians and laymen). It should be an acknowledgment of dental incompetency to have to ask for an interpretation of a dental radiogram, except when the interpretation is to be made by a dentist who has specialized on the subject, and then only when a consultation is held with the full clinical history of the case placed before the one making the interpretation.

A great many professional men expect too much of the dental radiogram, and thus get into trouble. Also a lack of knowledge of anatomy as shown radiographically is a potent factor for errors. A few years ago two very prominent authorities in dentistry, one a specialist in radiography and the other a specialist in oral surgery, had an argument regarding whether or not the infra-orbital canal could be radiographically shown over the second molar so as to appear as a dental pericementoma. The oral surgeon, although a good anatomist, did not know much about radiography, and would not believe this until a radiogram of the skull was made showing the infraorbital canal over the second molar. A case is known where a lay radiographer interpreted the second molar as "abscessed" when the above was the case. The result was that the tooth was extracted, but luckily, though perhaps unfortunately, the patient did not know the condition, or the dentist who accepted the lay radiographer's diagnosis would have had considerable trouble.

If a standard mount for a complete set of dental radiograms could be adopted by the dental profession, it would materially assist in keeping records. Complete sets of radiograms now being taken consist of from eight to twenty-four films on mounts from 3x5 to 8x10 sizes, loose films, celluloid, cardboard or glass. One mount that has been satisfactory for ordinary use is a stiff black composition board 5x7 with ten cutouts, one mount being used for the upper teeth and one for the lower teeth. The films are attached to the board by small strips of gummed paper. These mounts are light, easily mounted, carried or mailed without bending, breaking, or losing the films. They can be easily filed in a standard cabinet. A 3x5 black mount can be used for single films, which affords a filing cabinet having a 5x7 and a 3x5 drawer. These cabinets come in units and can be purchased from any office supply house. This will provide for filing single films and complete sets, and units may be added at will.

Envelopes can be printed providing for the interpretation of complete cases which will keep the radiographic record before the operator at all times. There should also be a standardization of terms used in interpretations. The most sought after radiographic opinion is whether a tooth is "abscessed" or not. When a dark area appears it is often classed as "abscessed," "rarefied area," "granuloma," "cyst," "infected area," and last, but most acceptable, "pericementoma."

A few state dental laws regulate dental radiography, but there should be a standard law adopted by this association that can be used by the different states in amending their laws.

Summarizing the above, we find:

That the x-ray should be used more extensively in dentistry;

That there should be full understanding of the dangers of the x-ray machine;

That a careful study of the standard method of interpretations should be made by dentists;

That standard mounts for dental radiograms should be adopted;

That standard laws should be adopted by the different states to regulate the practice of dental radiography.

THE TECHNIC OF ORAL RADIOGRAPHY

BY DR. CLARENCE O. SIMPSON, ST. LOUIS, MO.

REGIONS IN DETAIL (Continued)

Mandibular Second and Third Molar Region

(Continued from page 942.)

Position of Head. Reclined sufficiently for the occlusal plane of the mandibular teeth to be horizontal when the film holder or retaining finger is in place.

Vertico-horizontal Angle of Projection. Horizontal.

Modifications. Five degrees or more below horizontal where the teeth approach a vertical position, or the roots are unusually long. Five degrees or more above horizontal as the teeth are lingually inclined.

Mesio-distal Angle of Projection. Parallel with the mesial surface of the second molar.

Modification. Compensation for malposition if the second or third molar.

Placement of Film Packet. Longer dimension horizontal. Film holder attached near the middle of the upper side. Place packet to include the third molar region and extend mesially to the length of the packet; occlusally to include the cusps of the teeth in symmetrical relation to the side of the packet at the predetermined angle of projection.

Retention of Film Packet. Firm Pressure of the teeth on the film holder, or first finger of patient's opposite hand when the loss of maxillary teeth prevents biting on the film holder.

Cone. Centered midway the distal root of the second molar.

Spark Gap. 4 to 4½ inches.

Exposure. 100 to 130 milliamperes seconds at an 18 inch target-film distance.

Explanatory Description. The resistance and discomfort in placement of the film packet, and the superimposition of the external oblique ridge when heavily formed, are the principal difficulties incident to examination of the mandibular second and third molar region.



Fig. 1.—Position of film packet and holder for the mandibular second and third molar region.



Fig. 2.—Position of patient and cone for the mandibular second and third molar region.



A.



B.

Fig. 3A. and B.—Typical views of the mandibular second and third molar region.

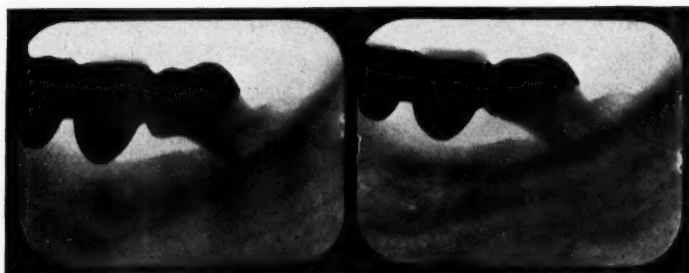


Fig. 4.—A case in which the external oblique ridge is superimposed at the apex of the third molar roots.



Fig. 5.—A case in which markedly cancellous bone, and proximity of the mandibular canal render it difficult to determine periapical conditions of the second and third molar.

The placement of the film packet to include the third molar region in some mouths requires considerable persistence and skillful manipulation, but can be endured better than the patient is inclined to believe. The holder should be attached near the upper edge of the packet when the vertico-horizontal angle is horizontal or above so the image will be recorded to harmonize with that of the first molar region. The packet should be entered between the tongue and molar teeth, and keeping the longer dimension approximately horizontal, forced downward and backward with an undulating movement to displace the soft tissues.

If excessive resistance is encountered, the lower distal corner of the packet is likely to be bent, and the first finger of the operator's adapting hand should be inserted between the tongue and the lower border of the packet to displace the tissues and straighten the packet. The packet must be tightly wedged in the holder, and the patient cautioned not to swallow during the exposure to prevent movement of the packet. The largest of the Raper holders is especially useful in retaining the packet when the teeth in this region are absent.

The external oblique ridge may obscure the second or third molar roots, and a deliberate modification of the angle of projection be indicated to better reveal conditions. Extreme inclination of the third molar may place the apex in such close relation to the oblique ridge that superimposition cannot be avoided. The great variance in the lingual inclination of second and third molars requires a wider range in the vertico-horizontal angle for this than other mandibular regions, and foreshortened images by the rays being directed from too low an angle is a common mistake.

The prevalent malposition of mandibular third molars often necessitates further examination at a greatly modified angle of projection, which should not be attempted in the routine examination of the region at the loss of information about the second molar. The periapical bone in the second molar region, with the contiguous mandibular canal and a tendency to large medullary spaces, is the most confusing unobstructed area to accurately interpret of an intraoral examination.

A slight increase in exposure is recommended for this over other mandibular regions because of the heavier alveolar process present, although it may result in overexposure of the area below the oblique ridge.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Food in Relation to the Use of the Teeth and Their Resistance to Dental Caries. R. R. Crees (San Francisco). The Pacific Dental Gazette, November, 1923, xxxi, 11.

The author mentions the absence of caries from various primitive peoples and the theory of Black that a masticating pressure of 300 pounds will secure immunity to caries, which means that food must be hard and require much chewing. While this may be part correct Dr. Grabham has recently called attention to the absence of caries in soft food eaters in one of the Maderia Islands. The so-called white Eskimos found by Stefansson, and who are believed to be of Nordic blood, share with the true Eskimos the total absence of caries. It is assumed that the Europeanization of the latter by the missionaries with the change in diet to canned goods, sugar and white flour may result ultimately in the appearance of caries, for this transition has been seen in the Maori of New Zealand. Thus, while 250 skulls of uncivilized Maoris show less than 1 per cent of caries the children of the modern aborigines who are living under European conditions show but 5 per cent who are free from caries. It is hardly likely that any of these primitive people will return to their pristine habits, and like the civilized white they must look for relief upon modern preventive dentistry.

Where Teeth Do Not Decay. Editorial in the Dental Digest, November, 1923, xxix, 11.

Dr. Grabham of London described his researches into the dentition of the native inhabitants of Porto Santo, one of the Maderia Islands, before the Physiologic Section of the British Medical Association at its recent session. In this small and out-of-the-way community there were neither dentists nor toothbrushes. The teeth were remarkably sound and the only traces of infection seem to have been in residents who had lived elsewhere for a time. There was no way in which this immunity could be explained save by the drinking water. The springs on the island are highly mineralized. Physiological use of the teeth could not be invoked, for the diet is notably

a soft one. The staple food is maize mush, which with other articles of diet, is always taken cold. There was neither flesh food nor green vegetables in the dietary but there were no signs of scurvy. The people seemed immune to gastric disorders and malignant growths but tuberculosis was encountered. Associated with the soundness of the teeth was a peculiar yellow stain, the latter appearing like a guarantee of dental integrity. It might be partly explained by unusual vascularity of the tooth structure, but was thought to be determined also in part by some special constituent of the drinking water. The yellow stain is not met with in Maderia, only a short distance away, where dental conditions are quite different.

Necrosis of the Jaw Following Mercurial Treatment. F. Faber (Munich). *Zeitschrift fur Stomatologie*, September, 1923, xxi, 9, 538.

The author has seen two cases of this sequence, one of which ended fatally from bronchopneumonia. Cases have also been reported by Partsch, Williger, Weichselmann and Schultze. Both upper and lower jaws have been attacked in this manner. In these cases the entire upper or lower jaw has come away, save that the ascending ramus has escaped. Considering the infrequency of this accident its severity is therefore remarkable, for one would naturally expect that milder cases could also develop. The accident does not occur *de novo* but is to be visualized as a rare sequela of mercurial gingivitis. The ulcerative process in the gums reaching down to the periosteum implicates the latter. This resulting periostitis robs the bone of its supply of nourishment and an extensive necrosis forms. The mechanism is not obvious but a putrefactive process is apparently added to an infection. The hydrogen sulphide formed as a result of albuminous decomposition is thought to unite with the mercury in the circulating blood and form a precipitate of mercury sulphide in the capillaries. Infection with buccal germs is facilitated. A vicious circle results.

Mouths which develop mercurial gingivitis are often in shocking condition with dead roots, cavities and masses of callus in pockets. The gums are ulcerated. If we attempt to disinfect these mouths we face the danger, which may follow extraction, of infection of the bone. Unless we do disinfect these mouths they will never be amenable to treatment. In one bad case of gingivitis the author cleaned the teeth and extracted such roots as were already loose. Some of the molars now began to ache which furnished a pretext to extract them as well. Nevertheless, the ulcerative gingivitis continued to spread until the entire jaw became necrotic. This was the patient who died of bronchopneumonia and was already septic. His other case is not mentioned.

The Dentition of the Western and Central Eskimos. S. G. Ritchie. *Oral Health*, November, 1913, xiii.

The original article is part of the report of the Canadian Arctic Expedition on the Copper Eskimos. The dental arches are large and beautifully formed, approaching closely the ideal of the Caucasian type. The curve is semielliptical and almost mathematically accurate. The anterior palatine

foramen is seated exactly at the focus of the ellipse. The absence of malocclusion is striking, and in but two of the many cases examined was any irregularity to be noted. The teeth meet edge to edge and great latitude of movement is permitted to the mandible. There is, as must happen in this kind of occlusion, great wear on the teeth, so that by middle life the crowns of the incisors are often worn completely away, while the molars have lost their cusps. Enough new dentine forms to obliterate the pulp chambers and this compensation was found in all cases where the latter were threatened. Infection of the pulps cannot occur under the circumstances, and there was no evidence of alveolar abscesses. Not the slightest trace of caries or pyorrhea was found, while salivary calculus was practically absent, and there was no absorption of the alveolar process. The latter is normally thicker than those of the Caucasian. The genoid fossa is characteristically broad and shallow. There is no projection of the roots into the antrum, which is unusually large, with thin walls.

Maxillary Sinus Infections from the Standpoint of a Rhinologist. C. G. Coakley (New York). *The Dental Register*, October, 1923, lxxvii, 10.

Apparently the dentists see more cases of antrum infection which originate in the mouth than the rhinologists. In the author's practice this incidence is but 3 per cent or so, while in the practice of a colleague it was 7.5 per cent. Doubtless the dentist sees a much greater incidence. Deformity usually signifies a dental origin for as a rule deformity does not exist. The author finds the pharyngoscope of great value in diagnosis, for it will show pus at the orifice of the antrum when the nasal speculum does not; but absence of pus does not exclude infection. Transillumination is a useful resource and one at the disposal of the dentist. Its application is very simple, requiring a separate three-cell battery and a lamp with shield with a dark room. If both sinuses happen to be involved the danger of an error is great. The next resource for diagnosis is anteroposterior radiography of the skull. Another procedure which may be advisable is irrigation of the antrum through an artificial opening through the nasoantral wall. The fluid used is normal saline and the washings are caught in a black pus bowl where they may be studied. An offensive discharge in an acute case suggests a dental origin. This diagnostic method is also the method for treatment. Suction pumps, etc., should not be used on these cases. The method of radiodiagnosis mentioned above is of no value to detect infection of the teeth, and ordinary dental radiography may follow it. Only acute cases should be treated by extraction of teeth, probing and irrigating by this route. In practice quite a few cases cannot be cured unless certain teeth have first been extracted. In a chronic dental case it is better to operate through the nose than attempt to cure the condition through a wide dental aperture, for the danger of reinfection is much less.

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EDITORIALS

Some Facts and Questions Regarding Dental Education

THERE is no more vital question at present than that of dental education. During the past few years there have been various changes, one of which has been the creation of dental hygienists. It was thought by many that these new workers would assist in supplying the demands of the public for dental service not filled because of the dearth of graduate dentists—a dearth occasioned by increased cost and requirements of dental education. Several years of experiment, however, have led to a great difference of opinion regarding the value of the dental hygienist to the community.

This movement has not produced sufficient benefit to overcome the criticism that arose at the time the hygienists were licensed. It is our opinion

that if the question is analyzed carefully, it will be admitted that the movement is not the success that many men claim. The answer to the problem will have to be found in the future of dental education. We would advise the states that favor the dental hygienist to make a careful study of the educational situation from a professional standpoint to see whether the hygienist will solve the problem in their state.

Another factor which must be considered is the increase of preliminary education required before a student can study dentistry, and the lengthening of the dental course from three to four years. We believe that neither the increase in preliminary requirements above the four years' high school course, nor the four years' dental course has produced a dental student better prepared to serve the public than was produced under the old system of four years of high school work, and three years of dentistry. Only recently a man who had spent years on a state board said that the present dental graduate was no better dentist than the one under the three year dental course. This is probably due to the fact that in many colleges where the preliminary work has been increased, and the dental term lengthened to four years, the student is taught no more actual dentistry than under the old three year system. We are not opposed to a thorough education, but we do believe that every increase in educational requirements with its consequent added cost, in time and money, must result in a product able to render greater service to the public, or the system is a failure. We believe that the present plan of dental education is a great economic waste, in time spent in improper preliminary training, in the number of years required in dental college and in the months spent on subjects which do not make the student a better servant of the public.

Dr. W. O. Talbot, in an article published in the Texas Dental Journal entitled "Why Do More Men Leave the Dental Profession Yearly Than Enter It?" attacks the educational problem from a different viewpoint. He quotes from Dr. Hartzell's presidential address before the National Dental Association and says, "Last year fourteen hundred and thirty-two dentists were admitted to practice, while during the same period of time nineteen hundred ceased to practice." We believe that a great amount of this trouble is due to the present educational system, and unless a change is advocated which will cause a greater number of men to enter the dental profession, the public will not receive proper service. As a result of this decrease in the number of dentists dental laws will be changed and conditions created which will be a detriment to the profession. Dr. Talbot calls attention to the fact that it requires four years and at least five or six thousand dollars for a student to complete a dental course. He says that during the four years a student is studying dentistry, he is prohibited from practicing any part of his profession, even under the supervision of a licensed dentist. Furthermore, he refers to the fact that in those states which license dental hygienists the educational requirements are not so strict for them; in fact they are less than for students of dentistry. A dental hygienist completes her course in from eight months to a year, after which she is given permission to work on a patient.

The dental student must have four years of dental college work in any state. In some states, he must have one year of college work, followed by four years in a dental college, and then pass a state board examination before he can practice any part of his profession upon a patient. Dr. Talbot believes that if a dental hygienist is qualified to render service to the public with less educational training than a sophomore student, then a dental student, with two years of training, is equally qualified to render a similar service under the supervision of a licensed dentist. This same writer calls attention to the fact that it is extremely unfair that some states allow girls, who have only passed the ninth grade, others who have had one year of high school work, none with more than a high school training in any, and thirty-two weeks in training in a hygienist's course, to work on the public, when a junior dental student with three years of college work, four years of high school in all states, one year of college work in others, is not allowed to do the same. Dr. Talbot believes it is also an imposition on the public. We are absolutely certain that with a slight change in the dental course a sophomore student would be able to render better service to the public after two years of college training. From an educational, as well as an economic, standpoint, we believe it is extremely unfair not to make some provision whereby the sophomore and junior dental students, during their vacations, could perform certain services under the supervision of licensed dentists, especially in those states which allow a certain service to be performed by dental hygienists, who are much more deficient in training. Quoting from Dr. Talbot's paper: "The freshman curriculum in dental colleges should be changed to include all the subjects now required of the dental hygienists. The freshman, after successfully completing his first year's work, should be permitted to take the state examination, and if qualified be given a permit, not a license, to assist some licensed dentist by doing the work of a dental hygienist for a specified time, say four months, subject to revocation from cause at the will of the board, or extended for a limited period not to exceed one year."

He further states that "The curriculum of the sophomore year should be arranged to teach enough operative dentistry to include all kinds of fillings, and provide sufficient practice in their insertion, together with such other subjects as should be taught in that year, after the completion of which the sophomore should be permitted to take an examination before his or her state board and, if qualified, given a permit to do dental prophylaxis and filling, in the office of a licensed dentist and with the same restrictions and limitations as of the previous year.

"The curriculum of the junior year should be arranged to include physical diagnoses, anesthesia and exodontia and also prosthetic dentistry, together with such other subjects as should be grouped therewith. Likewise, after the completion of this course, the student, should be permitted to take the examination before his or her state board and, if qualified, given a permit to do the specific operations covered in the three years' work, in an office of a licensed dentist under the restrictions and limitations named above.

"The curriculum of the senior year should cover such subjects as have not been included, particularly crown and bridge work, orthodontia and root canal treatment, after the completion of this course and graduation, students should then be permitted to take an examination for permanent license to practice dentistry in his or her state."

We can readily believe that a great many state boards that have framed the dental law to suit themselves would be very much horrified to have any one suggest that they should examine freshmen, sophomore and junior students for the purpose of granting them a permit to work in the office of a licensed dentist. However, we believe that the plan possesses many points of value, because of the fact that there are not enough dentists to take care of the public. A dental student, trained as Dr. Talbot has suggested, would be qualified to render to the public better service than is rendered by the dental hygienist. The plan would supply any real demand for dental hygienists with prospective dentists who would have at least four years or more literary education, plus the ability and ambition to practice dentistry. From an economic standpoint it would enable the misfits to find themselves early, with consequent saving, rather than allowing them to continue studying when they are bound to be failures.

We have already called attention to the fact that a dental education is an economic problem to many students. Dr. Talbot claims his plan will permit those who have to earn their way to enter college a few years earlier, because the students can expect to earn part of their expenses in a dental office, as they are being trained in the profession.

As a result of the decreasing number of dentists, the increasing cost of dental education, and the lengthened time required in the dental course, we believe some plan similar to that suggested by Dr. Talbot will be a decided economic advantage to both the student and the public. It will tend to simplify some of the problems rising in the attempt to satisfy the clamor for dental hygienists, dental assistants, and dental mechanics. We fail to see where the licensing of any of these groups is benefiting either the profession or the public.

ORTHODONTIC NEWS AND NOTES

The Southern Society of Orthodontists

The fourth annual meeting of the Southern Society of Orthodontists will be held Monday and Tuesday, January 21 and 22, 1924, at the Hermitage Hotel, Nashville Tenn. The following program is prepared:

Monday, January 21, 1924.

Morning Session.

9:00 Registration.

9:30 President's Address.

Business Session.

10:00 A Practical Talk on Orthodontic Treatments.

By John V. Mershon, D.D.S., Philadelphia, Pa.

12:00 Luncheon in the private dining room of Hermitage Hotel.

Afternoon Session.

2:00 Some Points of Relationship Between Orthodontia and Surgery of the Ear, Nose, and Throat.

By W. G. Kennon, M.D.

3:00 A Further Consideration of Some Phases of the Treatment of Cleft Palate Cases.

By Harry A. Kelsey, D.D.S., Baltimore, Md.

4:00 Dietary Habits in Children.

By John Lee, M.D., Nashville, Tenn.

7:00 Banquet in Honor of Dr. C. C. Howard, President Elect of the American Society of Orthodontists.

Toast Master, William C. Fisher, New York City.

Tuesday, January 22, 1924.

Morning Session.

9:00 Election of Officers.

9:30 Some Biological Considerations of Growth and Development and Their Relation to Orthodontic Problems.

By R. C. Derivaux, M.D., Nashville, Tenn.

10:30 The Early Treatment of Malocclusion of the Teeth.

By A. LeRoy Johnson, D.D.S., Ann Arbor, Mich.

12:00 Luncheon in the private dining room of Hermitage Hotel.

Afternoon Session.

3:00 to 5:00 Clinics.

- No. 1. Band and Lingual Lock. By Joseph E. Johnson, Louisville, Ky.
- No. 2. Some Mounted Appliances and What They Have Accomplished. By Herbert C. Hopkins, Washington, D. C.
- No. 3. High Buccal Tube. Appliance for Root Movement of Lower Incisors. By W. K. Slater, Knoxville, Tenn.
- No. 4. Several Cases under Treatment. By George B. Crozat, New Orleans, La.
- No. 5. Report of Several Cases with Lantern Slides. By Clinton C. Howard, Atlanta, Ga.
- No. 6. Modifications of Fixed Bite Plane and Its Attachments. By Harry E. Kelsey, Baltimore, Md.
- No. 7. Some Cases under Treatment, Showing Appliances Used. By Oren A. Oliver, Nashville, Tenn.
- No. 8. Upper and Lower Appliances for Expansion of Arches. By Harry A. Holder, Nashville, Tenn.
- No. 9. The Pinched Lingual Arch. By C. C. Johnson, Memphis, Tenn.
- No. 10. Various Types of Auxiliary Springs. By John V. Mershon, Philadelphia, Pa.
- No. 11. Mershon Lock in Extreme Short Bite Cases. By H. L. Parks.
- No. 12. Clinics from members of Southwestern Society of Orthodontists.

A cordial invitation is extended to all ethical members of the dental profession as well as those engaged in the exclusive practice of orthodontia, to attend this meeting.

Dr. Oren A. Oliver, President, Nashville, Tenn. Dr. H. C. Hopkins, President-Elect, Washington, D. C. Dr. Harry A. Holder, Secretary-Treasurer, Nashville, Tenn. Board of Censors, Dr. C. C. Howard, Dr. H. C. Hopkins, and Dr. J. E. Johnson.

Southwestern Society of Orthodontists

The Southwestern Society of Orthodontists will hold its fourth annual meeting in Waco, Texas, Thursday, Friday and Saturday, January 24, 25, 26, 1924. The officers presiding are: President, T. G. Duckworth, San Antonio, Texas; President-Elect, T. W. Sorrels, Oklahoma City, Okla.; Secretary-Treasurer, P. G. Spencer, Waco, Texas; Board of Censors, Oscar E. Busby, Dallas, Texas, William H. Chapman, El Paso, Texas, and Oren H. McCarty, Tulsa, Okla.

The following program has been arranged in group form which the committee hopes will meet with the approval of the members and guests:

PROGRAM

Thursday, January 24, 1924

- 8:30—Meeting Board of Censors.
- 9:00—Welcome Address: Dr. J. O. Hall, Waco, Texas.
Response: Dr. Harry Holder, Nashville, Tenn.
- 10:00—President's Address: Dr. T. G. Duckworth, San Antonio, Texas.
Discussion opened by Dr. O. E. Busby, Dallas, Texas; Dr. T. W. Sorrels, Oklahoma City, Okla.
Committee appointed to report on same.
- 11:30—Report of Board of Censors, new members, etc.
- 12:00—Luncheon, private room, Raleigh Hotel.
Short Talk by Dr. N. H. Bowman, Rhinologist, Waco.
- 1:45—GROUP 1:
Dr. Hugh G. Tanzey, Chairman, Kansas City, Mo.
Dr. William J. Brady, Kansas City, Mo.
Dr. L. C. Fairbanks, Fort Leavenworth, Kan.
Dr. W. A. McCarter, Topeka, Kan.
Dr. Harry A. Allshouse, Jr., Kansas City, Mo.
Dr. Homer A. Potter, Jr., Kansas City, Mo.
Dr. Louis M. James, Kansas City, Mo.
Dr. Samuel C. Wheat, Kansas City, Mo.
Dr. W. E. Wolff, Kansas City, Mo.
Dr. Sidney S. Block, Kansas City, Mo.
Subject: "Preventive Orthodontia."
Showing early symptoms of malocclusion, various methods for treating same with the view of preventing a more pronounced malocclusion which might be followed by deformity attended by pathological conditions.
- 3:15—GROUP 2:
Dr. T. W. Sorrels, Chairman, Oklahoma City, Okla.
Dr. O. H. McCarty, Tulsa, Okla.
Dr. E. F. Woodring, Tulsa, Okla.
Dr. W. E. Flesher, Oklahoma City, Okla.
Dr. T. M. Robertson, Coffeyville, Kan.
Subject: "Showing Models of Actual Cases Before and After Treat-

ment: Etiology, Diagnosis, Prognosis." (Illustrated.)

"Anomalies of Eruption and Number, of Form and Structure, of Position and Jaws, of Tongue, Muscles and Associate Soft Structures."

4:15—Table Clinics—General.

Dr. Homer B. Robison, Great Bend, Kan. Subject: "The Use of a Flat Labial Unthreaded Alignment Wire in Connection With the Lingual Arch."

Dr. P. G. Spencer, Waco, Texas. Subject: "An Anti-Mouth Breathing Device."

Dr. Harry E. Kelsey, Baltimore, Md. Subject: "A Rectangular Tube and Modification of the Lock for Attachments of Lingual or Other Arches." "Modification of the Fixed Bite-Plane and Its Attachments."

Dr. E. B. Arnold, Houston, Texas. Subject: "Soldered Sleeve Nut Expansion to a Lingual Appliance."

6:00—Auto ride over city.

7:00—Banquet, Raleigh Hotel.

GROUP 3:

Dr. A. H. Ketcham, Chairman, Denver, Colo.

Subject: "Case Indications for the Use of Some of the More Efficient Forms of Appliances" (illustrated), and "Co-operation Between the General Practitioner and the Orthodontist."

Dr. Harry E. Kelsey, Baltimore, Md. Subject: "A Further Consideration of Some Phases of the Treatment of Cleft Palate Cases."

Dr. H. C. Pollock, St. Louis, Mo. Subject: "The Cliff Dwellers." (Illustrated.)

Friday, January 25, 1924

9:00—GROUP 4:

Dr. O. E. Busby, Chairman, Dallas, Texas.

Dr. A. B. Conly, Dallas, Texas.

Dr. W. B. Stephenson, Amarillo, Texas.

Dr. E. E. Moore, Fort Worth, Texas.

Dr. N. H. Coleman, Wichita Falls, Texas.

Subject: "Discussion of the Advantage of Early Treatment of Malocclusion."

"Discussion of Treatment in Cases of Missing Teeth."

10:00—GROUP 5:

Dr. J. V. Mershon, Chairman, Philadelphia, Pa.

Subject: "Time to Start Certain Types of Cases and Why."

"The Value of the Auxiliary Spring with Time of Adjustments."

"The Value of Rest Periods in Treatment and When to Give Them."

"The Variability in Treatment."

Together with other practical hints and a discussion of the papers and clinics given by Southwestern members.

12:00—Luncheon, private room, Raleigh Hotel.

1:00—GROUP 6:

Dr. P. G. Spencer, Chairman, Waco, Texas.

Dr. Frank H. Harrison, Waco, Texas.

Dr. Curtis W. Williams, Shreveport, La.

Subject: "Golf." In order to stimulate a friendly relation among the members of the Society it was decided to hold a golf tournament each year, as in no other way can one become better acquainted than on the golf course.

7:00—Banquet, Spring Lake Country Club.

T. G. Duckworth, Toastmaster.

Distribution of prizes, etc.

Addresses by—

Dr. Joe B. Eby, New York City.

Dr. A. Leroy Johnson, Boston, Mass.

Dr. C. V. Mosby, St. Louis.

Dr. W. C. Fisher, New York City.

Subject: "Responsibilities of the Specialist in Orthodontics to His Patient, the General Profession and Himself."

"Prophylaxis."

Saturday, January 26, 1924

9:00—GROUP 7:

Dr. T. O. Gorman, Chairman, San Antonio, Texas.

Dr. Edmond B. Arnold, Houston, Texas.

Dr. William T. Chapman, El Paso, Texas.

Dr. J. M. Murphy, Temple, Texas.

Dr. E. A. Morris, San Antonio, Texas.

Subject: "Consideration of Open Bite Cases."

10:00—GROUP 8:

Dr. Clinton C. Howard, Chairman, Atlanta, Ga.

Subject: "Internal Secretions."

Discussion opened by—

Dr. Ross Jones, Waco, Texas.

Dr. K. H. Aynesworth, Waco, Texas.

Dr. J. W. Torbett, Marlin, Texas.

12:00—Luncheon, private room, Raleigh Hotel.

2:00—GROUP 9:

Dr. O. A. Oliver, chairman, Nashville, Tenn.

Dr. Oliver's work will be along the same lines that he gave before the Society last year, and his group is made up of members of the Southern Society. Subject: "Band Technic—Constructing and Adjusting the Removable Lingual Arch—Wire Pinching Technic—Comparative Value of the Materials Employed—Soldering and Auxiliary Spring Technic—Clinic Showing Appliances Used in Active Cases."

4:00—Business Session.

Election of officers; selection of place of next meeting; committee report on the President's address; new business, and adjournment.

New York Society of Orthodontists

In order not to conflict with the meeting of the American Society of Orthodontists which meets in Kansas City, Mo., March 18, 19, 20 and 21, 1924, the Annual Meeting of the New York Society of Orthodontists has been advanced two weeks and will be held Wednesday afternoon and evening, February 27, 1924, at the Hotel Vanderbilt, Park Avenue and 34th Street, New York, N. Y.—Wm. C. Fisher, Secretary, 501 Fifth Avenue, New York, N. Y.

Notes of Interest

Dr. Ashley E. Howes announces the opening of his office at 650 Main Street, New Rochelle, New York, for the exclusive practice of orthodontia.

Dr. Julius H. Levine, recently associated with Dr. Theodor Blum of New York, wishes to announce that he will now limit his practice to the specialty of oral surgery and radiography, 366 Commonwealth Ave., Boston, Mass.

Dr. Lester H. Tate announces the opening of offices in the exclusive practice of orthodontia, 228 Cleveland Ave., Canton, Ohio.

Dr. L. H. Wirt was elected president of the South Bend Dental Society at a meeting of the Society in December. Dr. Wirt is engaged in the exclusive practice of orthodontia in South Bend.

Dr. Homer A. Potter announces the removal of his office to suite 512 Commerce Trust Building, Kansas City, Mo.

Dr. Albert W. Crosby announces the removal of his office to 215 Whitney Ave., New Haven, Conn.

Dr. Elmer S. Best announces the removal of his office from 933 Metropolitan Bldg., to 505 New Yeates Bldg., Nicollet at Ninth Street, Minneapolis, Minn.

Dr. E. B. Arnold and Dr. J. H. Weaver announce the removal of their offices to Suite 708 Keystone Bldg., Houston, Texas, for the exclusive practice of orthodontia.